DEFENSE NUCLEAR AGENCY 76920
TECHNICAL LIBRARY DIVISION

DELETED VERSION ONLY

1994

Sanitized Version

# FINAL HISTORY

## TASK GROUP 7.4

# OPERATION REDWING

## 1955
## 1956

DNA1.941007.004

CLASSIFICATION CANCELLED
WITH DELETIONS
BY AUTHORITY OF DOE/DOD
REVIEWED BY Roy L. Weaver 5/8/86 DATE
DNA-DOE ltr 11/21/85
5/28/86

RG 374
Location Technical Library
Accession AFWL
Folder Final History - T.G. 7.4
Of. Redwing 1955-56

SWO 746552/5

AFWL/HO

HRE-0810

[redacted]

AUTHORIZATION

[redacted]

[redacted]

[redacted]

Prepared under Provisions of AF Regulation No. 210-3 and ARDC Regulation No. 210-1, as a part of the USAF Historical Program, and JTF-7 Standing Operating Procedure 172-701, dated 5 May 1955.

RG 342

Location Technical Library

~~Accession No.~~ AFWL

Folder Final History - T.G. 7.4

Op. Redwing 1955-56

SWC 75-46552/5

[redacted]

[redacted]

CLASSIFICATION CANCELLED
WITH DELETIONS
BY AUTHORITY OF DOE/DOD
J Kay KJ Seagel 5/06/86
REVIEWED BY DATE
DNA-DOE ltr 11/21/85
J Diaz 5/28/86

ArWL/HO

1a

[redacted]

# HISTORY

of

Task Group 7.4

in

Operation REDWING

by

M/Sgt William A. Evans

Historical Section
4950th Test Group (Nuclear)
Air Force Special Weapons Center
Air Research and Development Command
February 1957

SWC 7C-46552/

[redacted]

[redacted]

AFWL/HC




AFWL/HO

[redacted]

CONTENTS


FOREWORD . . . . . 1

LIST OF CHARTS, PICTURES, AND ILLUSTRATIONS . . . . . ii

CHRONOLOGY . . . . . iv

I. PLANNING FOR OPERATION REDWING. . . . . 1
CASTLE/REDWING Interim Period Planning . . . . . 1
Manning . . . . . 7
Materiel Planning . . . . . 8
Comptroller Planning . . . . . 9
Re-Manning of Task Group 7.4 . . . . . 9
Task Group Planning for REDWING. . . . . 13
Mission of the Task Group and its Units . . . . 17
Aircraft Requirements . . . . . 18
Two-Shot Concept . . . . . 35
Air Operations Control. . . . . 39
Plans for Air Drops of Weapons . . . . . 48
Rehearsals . . . . . 52
Air Force Construction in the Proving Ground. . 58
Flight Safety . . . . . 64
Radiation Safety and Monitoring . . . . . 69
Materiel Planning . . . . . 71
Security Planning . . . . . 77
Funding Policies for REDWING . . . . . 79
Notes . . . . . 83

II. OPERATIONAL PHASE OF OPERATION REDWING. . . . . 84
Mission and Organizational Structure of Task Group 7.4 Units . . . . . 84
Test Aircraft Unit. . . . . 85
Test Base Unit. . . . . 91
Test Services Unit. . . . . 92
Personnel Strength and Morale. . . . . 101
Shots and Aircraft Participation . . . . . 103
LACROSSE, 5 May 1956 . . . . . 104
CHEROKEE, 21 May 1956 . . . . . 105
ZUNI and YUMA, 28 May 1956. . . . . 106
ERIE, 31 May 1956 . . . . . 107
SEMINOLE, 6 June 1956 . . . . . 108
FLATHEAD and BLACKFOOT, 12 June 1956. . . . . 108


[redacted]

[redacted]

KICKAPOO, 14 June 1956 . . . . . 109
OSAGE, 16 June 1956 . . . . . 111
INCA, 22 June 1956 . . . . . 112
DAKOTA, 26 June 1956. . . . . 114
MOHAWK, 3 July 1956 . . . . . 115
APACHE, 9 July 1956 . . . . . 116
NAVAJO, 11 July 1956 . . . . . 117
TEWA, 21 July 1956 . . . . . 118
HURON, 22 July 1956 . . . . . 118
Air Operations Control . . . . . 119
Maintenance Control. . . . . 122
Airlift. . . . . 124
Aircraft Accidents . . . . . 126
Radiological Safety Activities . . . . . 129
Notes. . . . . 131

III. ROLL-UP PHASE OF OPERATION REDWING. . . . . 132
Supply and Equipment . . . . . 132
Materiel. . . . . 132
Complete Assembly Shelters . . . . . 135
Runway Arresting Devices . . . . . 135
Short Range Aircraft . . . . . 136
Air Operations Center Equipment . . . . . 137
Movement of Personnel to the Zone of Interior. . . 137
Costs of Task Group 7.4 Operations . . . . . 138
Construction Requirements for Future Operations. . 140
Notes. . . . . 150

GLOSSARY OF ABBREVIATIONS . . . . . 151

INDEX . . . . . 157

[redacted]

[redacted]

[redacted]

AFWL/HC

FOREWORD

This monograph recounts the activities of the United States Air Force, through Task Group 7.4, in the 1955-1956 nuclear test series, Operation REDWING, an operation conducted in the Pacific Proving Ground. The planning, build-up, operational, and roll-up phases are treated from an over-view standpoint. For detailed information on various aspects of the operation, the reader is invited to examine other documents, chief among these being the monthly histories of Task Group 7.4 covering the period 15 June 1955 to 31 July 1956, and the Commander's Final Report. The cited documents are retained in the archives of the 4950th Test Group (Nuclear), Kirtland Air Force Base, Albuquerque, New Mexico. A limited pictorial collection is also available.

Master Sergeant William A. Evans wrote all portions of this monograph. Airman Second Class William R. Renaud performed the associated clerical tasks. The author is endebted to the Staff of Task Group 7.4 for guidance and cooperation in preparation of the document, particularly to Colonel Paul R. Wignall for his personal attention to, and assistance in, the solution of the manifold research and writing problems.

This study being subject to revision, additional information or suggested corrections will be welcomed.

[redacted]

[redacted]

[redacted]

## LIST OF CHARTS AND ILLUSTRATIONS


| Title | | Page |
|---|---|---|
| Colonel John S. Samuel, Commander | Frontispiece | |
| Organization of Joint Task Force SEVEN for Operation REDWING | following | 1 |
| Organizational Chart of Task Group 7.4 | following | 12 |
| Air Force Participating Organizations | following | 84 |
| Eniwetok Operations | following | 92 |
| Calendar of Events | following | 102 |
| Aircraft Participation | following | 103 |
| Positioning Diagram for Effects Aircraft, LACROSSE | following | 104 |
| Positioning Diagram for Effects Aircraft, CHEROKEE | following | 105 |
| Positioning Diagram for Effects Aircraft, ZUNI | following | 106 |
| Positioning Diagram for Effects Aircraft, FLATHEAD | following | 108 |
| Positioning Diagram for Effects Aircraft, DAKOTA | following | 114 |
| Positioning Diagram for Effects Aircraft, NAVAJO | following | 117 |
| Positioning Diagram for Effects Aircraft, TEWA | following | 118 |
| Aircraft Inventory by Type and Field Maintenance Man Hours | following | 122 |


[redacted]

Aircraft Flying Time . . . . . following 123

H-19 Aircraft Utilization . . . . . following 124

L-20 Aircraft Utilization . . . . . following 124

C-54 Aircraft Utilization . . . . . following 125

C-47 Aircraft Utilization . . . . . following 126

SA-16 Aircraft Utilization . . . . . following 126

[redacted]

[redacted]

[redacted]

## CHRONOLOGY

| | | |
|---|---|---|
| 26 June | 1954 | Responsibility for initial planning for Operation REDWING placed on Air Research and Development Command. |
| -- April | 1955 | Planning responsibility further delegated to Air Force Special Weapons Center. |
| 9 May | 1955 | Programming Plan 3-55 published by AFSWC. |
| 15 June | 1955 | Initial book message issued by USAF to all Air Force Commands, advising of the planned operation and establishing the basic organizational structure of Task Group 7.4. |
| 15 June | 1955 | Re-manning of Task Group 7.4 was begun. Colonel John S. Samuel named Commander. |
| 30 June | 1955 | Concept of Task Group 7.4 Operations published. |
| 16 August | 1955 | Operations planning conference conducted. |
| 1 October | 1955 | Final book message issued by USAF. |
| 1 October | 1955 | Task Group 7.4 Planning Directive published. |
| 29 November | 1955 | Three-day logistics conference began, to ascertain status of, and explain policies for, Materiel activities. |
| 29-30 November | 1955 | Preliminary positioning conference conducted, to determine positions for various aircraft in test arrays. |
| 9-13 January | 1956 | West Coast operational check conducted on USS Estes Combat Information Center. |

[redacted]

v

| | | |
|---|---|---|
| 25 January | 1956 | First increment of advance echelon departed from Kirtland AFB for Pacific Proving Ground. |
| 15 February | 1956 | Operations Plan 1-56 published. |
| 7 March | 1956 | Headquarters Task Group 7.4 officially became operational in the proving ground. |
| 6 April | 1956 | First operational test of Air Operations Center conducted in a rehearsal for LACROSSE. |
| 12 April | 1956 | FLATHEAD rehearsal held. |
| 16 April | 1956 | ZUNI rehearsal held. |
| 18 April | 1956 | MOHAWK rehearsal held. |
| 21 April | 1956 | Second ZUNI rehearsal held. |
| 24 April | 1956 | Dual shot rehearsal of INCA and CHEROKEE conducted. |
| 28 April | 1956 | Second CHEROKEE rehearsal conducted. |
| 5 May | 1956 | LACROSSE detonated at YVONNE Island, Eniwetok Atoll. |
| 21 May | 1956 | First known airdrop in history of a thermonuclear weapon, CHEROKEE, performed over CHARLIE Island, Bikini Atoll. |
| 28 May | 1956 | Dual shots accomplished, ZUNI at TARE Island, Bikini Atoll, and YUMA at SALLY Island, Eniwetok Atoll. |
| 31 May | 1956 | ERIE fired at YVONNE Island, Eniwetok Atoll. |
| 6 June | 1956 | SEMINOLE detonated at IRENE Island, Eniwetok Atoll. |
| 12 June | 1956 | Second dual shot accomplished, FLATHEAD at DOG Island, Bikini Atoll, and BLACKFOOT at YVONNE Island, Eniwetok Atoll. |

[redacted]

| | | |
|---|---|---|
| 14 June | 1956 | KICKAPOO fired at SALLY-Island, Eniwetok Atoll. |
| 16 June | 1956 | OSAGE, the second airdrop of the REDWING series, released on an YVONNE Island target, Eniwetok Atoll. |
| 22 June | 1956 | INCA detonated at PEARL Island, Eniwetok Atoll. |
| 26 June | 1956 | DAKOTA fired from a barge off DOG Island, Bikini Atoll. |
| 3 July | 1956 | MOHAWK detonated at RUBY Island, Eniwetok, Atoll. |
| 9 July | 1956 | APACHE detonated from a barge off FLORA Island, Eniwetok Atoll. |
| 11 July | 1956 | NAVAJO detonated from a barge off DOG Island, Bikini Atoll. |
| 21 July | 1956 | TEWA detonated from a barge off DOG Island, Bikini Atoll. |
| 22 July | 1956 | HURON, the seventeenth and last shot of the 1956 test series detonated from a barge off FLORA Island, Eniwetok Atoll. Roll-up phase commenced. |
| 27 July | 1956 | All aircraft, except those to be stationed at Eniwetok, were enroute to their permanent organizations. |
| 1 September | 1956 | Roll-up phase officially ended. |

[redacted]

AFWL/h

//

[redacted]

# CHAPTER I

## PLANNING FOR OPERATION REDWING

### CASTLE/REDWING Interim Period Planning

During the later stages of Operation CASTLE, the 1954 series of nuclear and thermonuclear tests conducted in the Pacific Proving Ground, announcement was made of another similar series of tests, proposed for the spring of 1956, in the Pacific Proving Ground. This proposed test series was to be known as Operation REDWING.

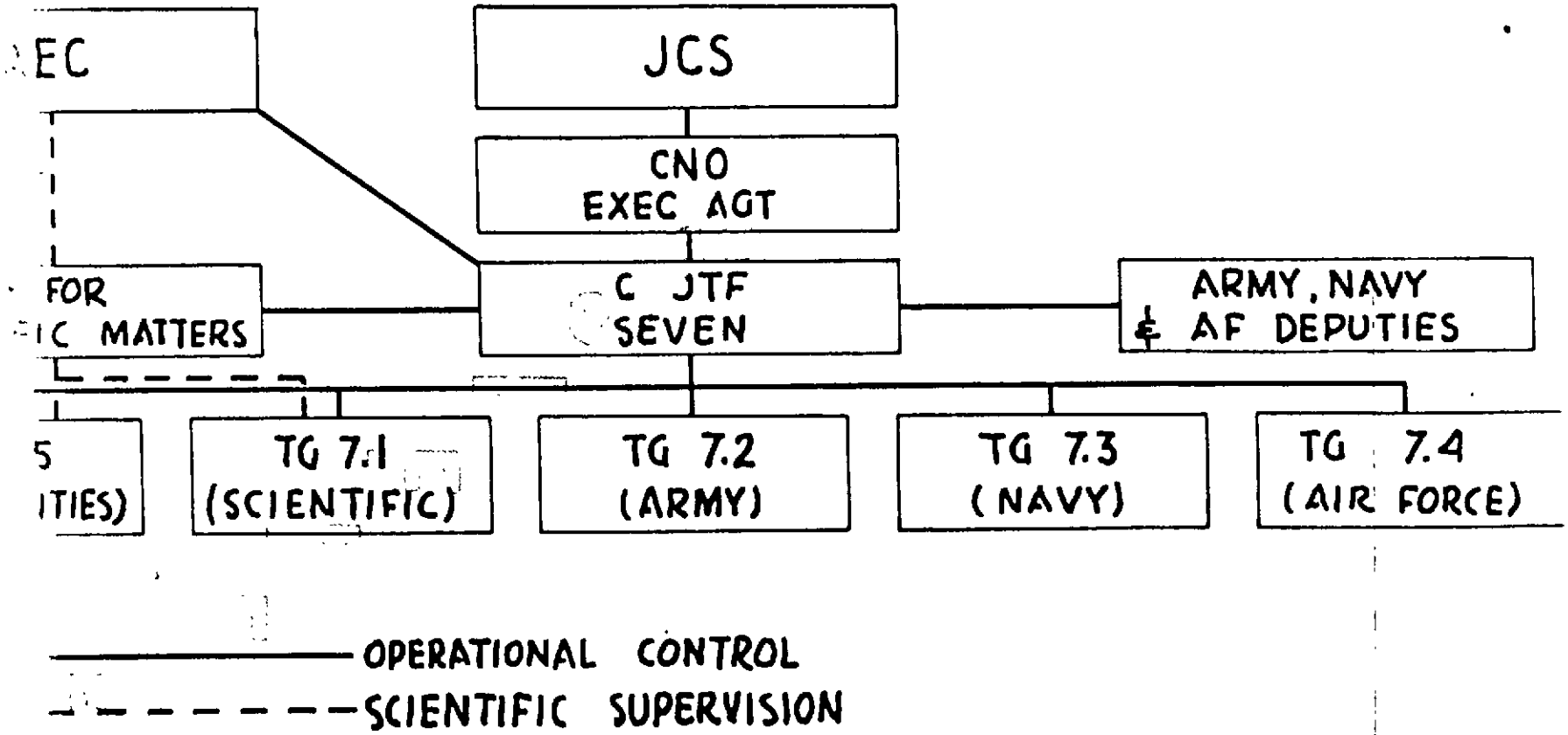
Advance planning for Operation REDWING was hampered during the first few months of the CASTLE/REDWING interim period by the necessity of planning for Operation TEAPOT, a series of nuclear tests held at the Nevada Test Site in early 1955. The possibility of a second 1955 test series, Operation DIXIE, originally planned for the fall of that year at the Nevada Test Site, served also to complicate the preparations for REDWING.

However, as the operational phase of TEAPOT approached, the cancellation of DIXIE became likely, although some consideration had been given only to the delay of DIXIE until the spring of 1956. The delay of DIXIE would necessitate, therefore, a postponement also of REDWING. Upon recommendation of Dr. Alvin C. Graves of Los Alamos Scientific Laboratory, to the Atomic Energy Commission, the cancellation of DIXIE was effected. In a forecast

[redacted]

[redacted]

# GANIZATION OF JTF SEVEN FOR REDWING



of test requirements in March 1955, Headquarters, Field Command of the Armed Forces Special Weapons Project, the cancellation was confirmed, the contemplated number of shots for REDWING was revealed, and the fact was stated that air participation for REDWING would probably be greater than that of Operation CASTLE. The forecast explained:[1]

> Instead of the six large shots previously contemplated, there will probably be three in the MT [megaton] class, one of which may be an airdrop. There will be about seven of the smaller Nevada [Nevada] Test Site type shots. Department of Defense research and development project participation will be on a similar scale to that of Operation CASTLE and will probably involve more test aircraft activity including drones.

Responsibility for the initial planning for Operation REDWING was placed on the Air Research and Development Command on 26 June 1954, when the Air Force inactivated the Task Group 7.4 which supported Operation CASTLE. Many personnel previously assigned to that task group had been reassigned to staff sections within the Special Weapons Center, or to units of the Center, and were therefore available to assist in the initial planning phase of REDWING. A greater portion of these remaining at Kirtland were reassigned to the Field Test Office, 4925th Test Group (Atomic).

The responsibilities of the Center in planning for REDWING were outlined by Air Research and Development Command in April 1955. The Center was directed to assume the planning until Task Group 7.4 was reactivated.

[redacted]

Specific responsibility for interim planning in turn was delegated by the Center to the Joint Field Test Operations Branch under the Deputy Chief of Staff for Operations. Colonel Thomas T. Omohundro and, later, Major Harry H. Elmendorf manned this branch and acted for the to-be-designated task group Director of Operations in attendance at planning conferences and in assembling a file of planning documents for REDWING. Planning actions by the Field Test Operations Branch, thus, were smoothly transferred to and coordinated with the task group Operations Directorate when the task group ultimately took over the planning responsibility.

The Field Test Office of the 4925th Test Group (Atomic), normally charged with pre-test planning, did not participate widely in REDWING initial planning, because, during this period, the Field Test Office was engaged primarily with Operation TEAPOT then in progress. However, many personnel of the Field Test Office were reassigned to the task group Operations Directorate shortly after the completion of the TEAPOT final reports.

Two general REDWING planning documents were produced by Center action prior to the remanning of Task Group 7.4. One, produced for the proposed task group on 9 May 1955 after a conference at Headquarters, Air Force Special Weapons Center, was the programming plan for the initial planning.[2] This plan analyzed the problems concerning the early planning for REDWING

[redacted]

and established firm responsibilities of the Center Staff which were to remain in effect until the Headquarters of Task Group 7.4 was organized. The plan contained a listing of the objectives and mission of the Air Task Group, the proposed schedule of events for REDWING, a forecast of aircraft requirements for planning purposes, and the specific tasks assigned to each of the staff sections of the Center.

The programming plan stated that approximately 14 shots would be fired in the REDWING series, the smaller yield shots (possibly nine) being detonated in the Eniwetok Atoll and the larger yield shots (five) being detonated in the Bikini Atoll. An air drop of a weapon in the megaton range was proposed, but no indication was given in the plan that this device was to be a thermonuclear weapon.

The second general planning document produced by the Center was a planning guide to be used primarily as an aid to Center personnel.[3] The guide listed several recommendations for major military requirements for REDWING, particularly for air transportation in the proving ground. Significantly, the guide asserted that "if B-57 samplers prove satisfactory on TEAPOT . . ." eight of these aircraft would probably replace the 16 F-84G aircraft used for sampling operations during the CASTLE series.

On 20 April 1955, Center delegates attended a conference at Headquarters, Air Research and Development Command, meeting

[redacted]

with representatives of that command, Wright Air Development Center, and Cambridge Research Center. The conferees discussed the support requirements of Task Group 7.4, in preparation for a similar conference at Headquarters, Joint Task Force SEVEN. Much of this conference was devoted to the requirements of Wright Air Development Center, for which approximately seven aircraft, a B-52, a B-47, a B-66, a B-57, an F-101, and two F-84J's, were necessary. A tentative schedule of events as planned by Joint Task Force SEVEN was revealed, indicating that Task Group 7.4 would be activated early in July 1955, that a Zone of Interior dress rehearsal would be conducted in early April 1956, and that the first shot would be fired approximately 15 April 1956.

The operational concept of REDWING was discussed at the requirements conference at Headquarters, Joint Task Force SEVEN on 21 April 1955, at which time the 14-shot schedule was made more firm. At this conference, some 75 aircraft were considered for participation. Besides the seven aircraft to be used by Wright Air Development Center for effects tests and measurements, 17 aircraft (six B-57B, three B-57D, and eight F-84G types) were to be used for sampling, 19 for airlift support, 3 for documentary photography, 10 for weather reconnaissance, 7 for search and rescue, 2 for air drops, and 10 for other purposes.

At this conference, the Center was assigned the responsibility of preparing the initial draft of the "Book Message" to be sent

[redacted] [redacted]

to major commands by Headquarters United States Air Force, directing participation in REDWING. The initial proposed document was completed by the Joint Field Test Operations Branch and was forwarded to Air Research and Development Command on 11 May 1955. Subsequently, it was submitted in condensed form to Headquarters United States Air Force and on 15 June issued by teletype to all major Air Force commands. The fact that the Navy had been designated as executive agent for REDWING by the Joint Chiefs of Staff was confirmed for the first time in this teletype message.

The teletype message merely advised major commands of the planned operation and did not contain detailed planning information. It did establish the basic organizational structure and authorize direct communication between participating units. The complete "Book Message," as prepared by the Center Joint Field Test Operations Branch, was held in abeyance until the issue on 8 July 1955 of the "green paper" of the Joint Chiefs of Staff, which contained authority to proceed with Operation REDWING.

Another important action taken during the interim planning period was the development of the concept for the REDWING Air Operations Center. The concept was the product of Major John A. deVries, at that time a member of the 4925th Test Group (Atomic) Field Test Office, who later joined the Task Group 7.4 Operations Directorate. Major deVries presented the concept to

[redacted] [redacted]

the Center on 24 May 1955. Five alterations were incorporated into the proposed concept before it was published in final form, chief among these being the following additions: (a) Facilities and procedures were to be based on those established for CASTLE. (b) A dual operating capability was to be maintained by function of the Air Operations Center at Eniwetok and the Combat Information Center, aboard the USS Estes, at Bikini. (c) Approach control was to be included as a function of the Air Operations Center.

A conference, thus, was scheduled with Rome Air Depot personnel to discuss types and procurement of equipment for the Air Operations Center. This conference was set for 15 June 1955, the same day the manning of Task Group 7.4 was begun. No difficulty was foreseen in acquiring sufficient funds from either Joint Task Force SEVEN or Air Research and Development Command.

Manning. Action to obtain the necessary personnel to man Task Group 7.4 was initiated by the Center Deputy Chief of Staff for Personnel early in 1955, when surveys were conducted to determine the number and types of personnel available from Center sources and how many would have to be requisitioned from Air Research and Development Command. For this planning, the Unit Manning Document established for the CASTLE task group was used as a reference.

[redacted]

[redacted]

In February 1955, the Center Personnel Directorate submitted to Air Research and Development Command a list of airman Air Force Specialty Codes, requesting that the 40 airmen to fill these requirements be requisitioned to report to the task group by 1 June 1955. A total of 23 officers were requisitioned at the same time. The remaining requirements were to be filled from Center sources.

The Center Personnel Directorate also endeavored to augment the 4930th Test Support Group at Eniwetok. To attain a gradual increase, a series of reporting dates was scheduled for those personnel requisitioned from Air Research and Development Command, this series of dates to extend from August 1955 to March 1956. An effort was made to assure that the more immediately utilizable personnel were provided first. This scheduling largely was based on experience gained during Operation CASTLE.

Materiel Planning. Three important Materiel transactions were inaugurated during the interim period by the Center Materiel Directorate. The first of these was the initial computation of estimated requirements for petroleum, oil, and lubricants. The computation, in accordance with directions from Joint Task Force SEVEN, was completed and forwarded to the Commander, Service Force, United States Pacific Fleet.

The second Materiel action was the submission to Joint Task Force SEVEN of the estimated requirements for general purpose

[redacted]

vehicles for use in the proving ground. After several exchanges of correspondence, dealing with adjustments of the estimation, on 27 July 1955 Joint Task Force SEVEN allocated 92 vehicles to Task Group 7.4.

The third action was to secure a waiver from Air Force of mandatory clothing requirements for REDWING personnel going to the proving ground in temporary duty status. This waiver, granted on 22 June 1955, set aside the requirement for taking a full allowance of winter clothing to the proving ground. The request for waiver was based primarily on the fact that woolen clothing was highly susceptible to rapid deterioration in the Pacific climate, and controlled storage facilities were extremely limited.

Comptroller Planning. During May 1955 Lieutenant Colonel Clarence M. Sartain of the Center Comptroller Section, later appointed Comptroller for Task Group 7.4, prepared a document listing the funding policies for the task group. These policies were approved without change by the comptrollers of both Air Research and Development Command and Joint Task Force SEVEN. The policies were ready for use by the task group when the task group assumed planning activities in June 1955.

## Re-Manning of Task Group 7.4

Inasmuch as the air task group which supported CASTLE was a provisional unit, as was the one supporting REDWING, no authority other than a Center General Order was necessary to begin re-manning. Upon completing the CASTLE mission the task group had

[redacted]

been de-manned and the personnel spaces retained unfilled by Center during the interim period. Thus, no reactivation procedure was necessary to re-constitute Task Group 7.4.

The official re-manning of Headquarters, Task Group 7.4 began on 15 June 1955, when, by Special Weapons Center General Order Number 23, Colonel John S. Samuel was assigned as Commander.

On a Personnel Action Memorandum dated 20 June 1955, Major Harry D. Black was appointed Air Provost Marshal with additional duty as Personnel Officer; Lieutenant Colonel Clarence M. Sartain was assigned as Comptroller; Lieutenant Colonel Francis B. Carlson was named as Director of Operations; and, Lieutenant Colonel Carl W. Robbins, Junior, was appointed Director of Materiel.

Thus, the nucleus of the staff was ready to begin planning operations by the end of June 1955; however, an immediate shortage of qualified officers prevented the filling of several other key staff positions. As late as six weeks after the re-manning began, Colonel Samuel's staff still lacked a full-time Personnel Officer, Adjutant, and Historian.

Learning that the Center Personnel Directorate had requisitioned officers from Air Research and Development Command to assume these positions, but that no qualified persons were available, Colonel Samuel requested that a Center representative visit Command to determine what disposition had been made of the requisition for key personnel. Lieutenant Colonel B. E. Forrest,

[redacted] [redacted]

who made the visit, learned for the first time that Command expected the Center to provide personnel for the key positions from Center resources. These positions were yet unfilled at the end of July, and efficient operation of the task group was seriously impaired during the first two months.

Also contributing to the problems encountered during the organizational phase was the the early arrival of other personnel requisitioned from other Air Research and Development Command bases. Many personnel, particularly airmen, in compliance with a reporting date of 1 June, arrived for duty with the task group early in June. The task group not being yet organized, these personnel were placed temporarily in Center organizations which often were not able to utilize effectively the surplus persons. In order to reduce the confusion caused by the early arrivals and to provide a headquarters for assigning additional arrivals, Colonel Samuel, then the prospective Commander, decided to activate the task group immediately.

During the first few days of re-manning, a significant morale problem was apparent. Many airmen arriving at Kirtland from other bases had been informed that they would be at Kirtland only long enough for overseas processing before being sent to the proving ground. Acting on this information, many personnel left their dependents at their previous duty stations, some sold their automobiles, and virtually all took extended leaves on

[redacted] [redacted]

the assumption that they were soon to begin an overseas tour which would be of a year or more in duration.

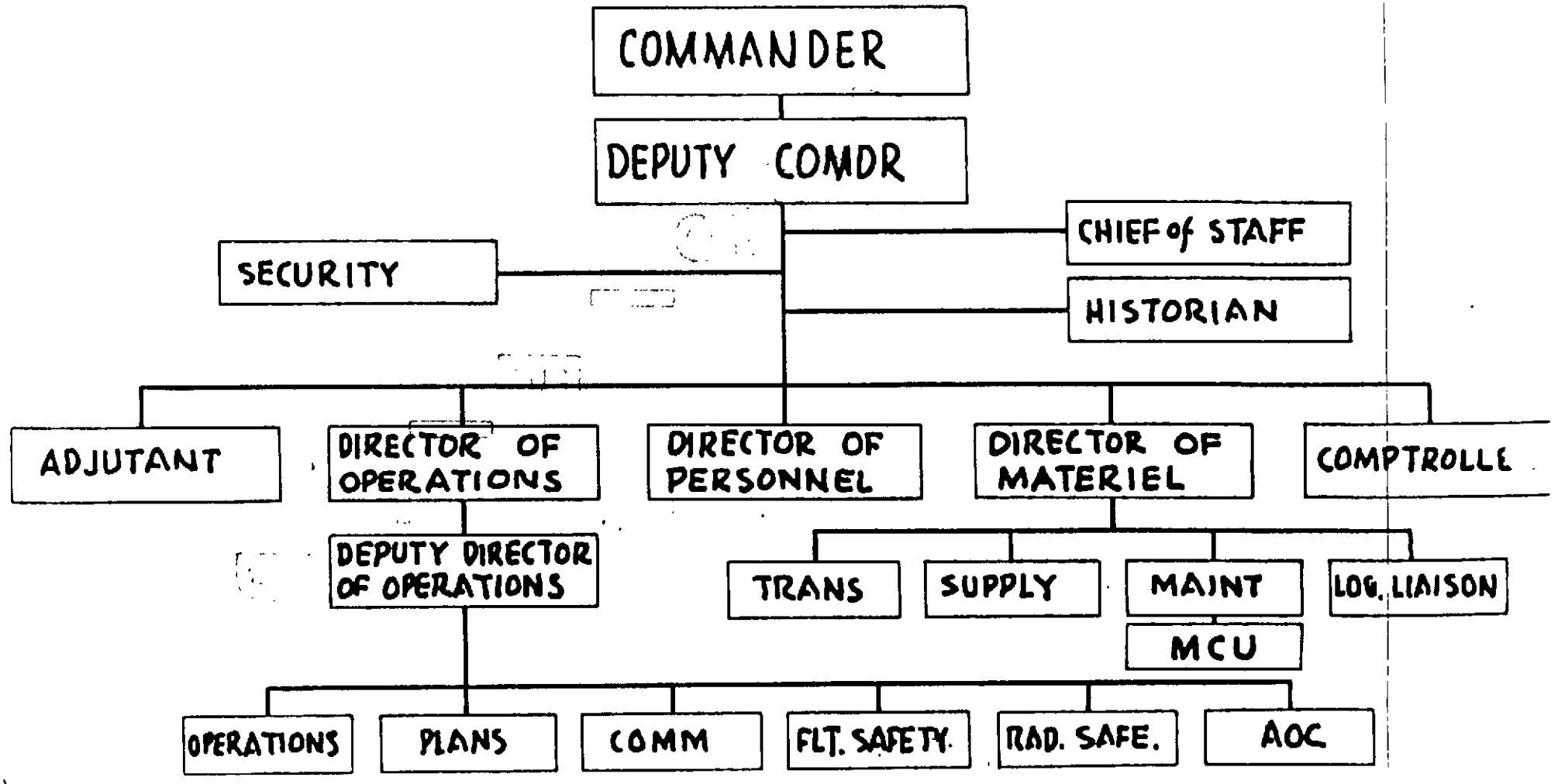
Only 17 officers and 45 airmen positions were filled during the first six weeks after re-manning began; 35 officers and 60 airmen were authorized on the Unit Manning Document.

One of the first command actions taken by Colonel Samuel was the directing of a complete study of the Unit Manning Document under which Task Group 7.4 was to be manned, his aim being to leave vacant unnecessary positions in both airmen and officer categories. Consequently, Colonel Samuel recommended that the Manning Document, which in reality was that used by the CASTLE task group as a basis for REDWING manning, remain fundamentally unchanged but that four officer and nine airmen spaces be unfilled. This action, therefore, in effect reduced the total essential officer strength to 31 and the total essential airmen strength to 51. These numbers were used as a basis for manning throughout REDWING.

In August, both a full-time Director of Personnel and an Adjutant were assigned, and an airman Historian was assigned in September. Hence, with the exception of a full-time Staff Maintenance Officer, the major staff spaces were filled by the end of September. Captain Philip A. Roccaforte, of the 4928th Test Squadron was appointed by Colonel Samuel to assume the Staff Maintenance Officer function as a duty additional to a similar

[redacted] [redacted]

# ORGANIZATIONAL CHART OF TASK GROUP 7.4



one in his squadron. The Captain eventually was permanently assigned to full-time duty with the task group. Thus, at the end of September, 25 officers and 49 airmen were performing duties with the task group, and planning was becoming greatly accelerated.

Task Group Planning for REDWING

As the various directorates of Task group 7.4 were manned, the Center staff sections transferred their planning tasks. In several instances, personnel involved in the interim planning as members of the Center were assigned to similar positions in the task group, allowing much continuity in the planning mission. However, a majority of the task group staff personnel were assigned from the 4925th Test Group (Atomic). The task group Commander himself was serving as Commander of the 4925th at the time he was named acting Commander of the task group; he continued to fill the 4925th Commander space until January 1956, when he was relieved of that duty and began the full-time performance of duty as the task group Commander.

Shortly after re-manning was begun, a proposed schedule of events for REDWING was compiled. This document, based on 1 May 1956 as the date of the first REDWING shot, was forwarded immediately to all planning agencies, project personnel, and commanders of air task group units and elements, to provide a basis for planning actions. The schedule differed somewhat from the Joint Task Force SEVEN schedule of events which had been revealed on 20

[redacted]

April 1955 and which had been based on 15 April 1956 as the approximate date of the first shot. The new schedule, however, was used throughout the planning period, and virtually all scheduled events occurred generally according to the plan.

A general basis for planning was furnished by the task group Concept of Operations,[4] distributed in July to all agencies of the new task group. This concept outlined the proposed scheme of activities for the group, and was later modified and incorporated in the operations plan. The concept described among other things the shot schedule, the operational organization of the group, the mission and objectives, and the phases of the test series. The shot schedule, as described by the concept, included the air drop of CHEROKEE, a [redacted] thermonuclear device, in the Bikini Atoll.

Late in July, Colonel Samuel and Colonel Paul R. Wignall, named on 1 August 1955 as Deputy Commander for Task Group 7.4, attended a conference conducted by Task Group 7.1 at Los Alamos Scientific Laboratory, at which time the Los Alamos staff reviewed the general concept of the scientific operations for REDWING and of the support required for those operations. Other representatives of REDWING agencies gave brief summaries of their operational concepts and of the support required. From the information presented, the Task Group 7.4 representatives were enabled to construct a revised picture of the requirements for air support.

[redacted]

When the Joint Task Force SEVEN Planning Directive was received by the task group early in August, work was resumed on the directive message to Air Force agencies which were to participate in REDWING. Whereas the original "Book Message," prepared by the Center and issued to Air Force agencies in July, was only an advisory of the impending REDWING series, the revised draft contained the latest operational information and offered a broader and more specific basis for the planning required of Air Force units. The final "Book Message" after considerable revision, was dispatched to proposed REDWING units as an Air Force directive on 1 October.

The delay of approximately five weeks in processing the directive through the various Air Force agencies significantly hampered planning activities. The major difficulty caused by the delay involved the establishment by Military Air Transport Service of the Test Services Unit, one of the three principal subordinate units of Task Group 7.4. The Commander of the Military Air Transport Service was unable to proceed with the organization of the unit until officially directed to do so, and could neither make commitments for furnishing required aircraft nor supply detailed planning information for the support of Military Air Transport Service operations until the directive became official.

After publication of the document, several discrepancies were discovered, the chief among these being the reduction in

[redacted]

the published document of the number of aircraft controllers from eight to three, the fact that Air Training Command had not been directed to support Operation REDWING, and an inconsistency in the requirement for security clearance.

The task group listed these discrepancies and submitted the list to Headquarters United States Air Force, asking that the air controller complement be increased to eight, that Air Training Command be added to the roll of commands assisting in the performance of the mission, and that the security portion of the document be re-written to require a final SECRET clearance of all REDWING personnel and to require a final TOP SECRET clearance for all personnel needing access to Atomic Energy Commission Exclusion Areas or having access to TOP SECRET information in the regular performance of duty. These changes ultimately were made without difficulty.

Great advancement in planning was made possible by a three-day operational planning conference by the task group in mid-August, the purpose of which was to coordinate all air activities, to ascertain that all scientific programs and projects requiring air operations were known, and to coordinate the logistic requirements of the participating organizations. At that time, the proposed operational organization of the task group was made known, consisting of the Test Aircraft Unit, the Test Base Unit (which basically was the 4930th Support Group, already at Eniwetok),

[redacted]

and the Test Services Unit (a Military Air Transport Service organization). Virtually all areas of air test activity were considered and discussed at great length during this conference, including aircraft requirements, aircraft modification, airlift, photography, sampling, weather, aircraft parking and decontamination, aircraft control and positioning, communications, air drops (OSAGE and CHEROKEE), flight safety, radiological safety, logistics, aircraft maintenance, security, and funding.[5]

Mission of the Task Group and its Units. The primary mission of Task Group 7.4 was to provide, support, and control the aircraft necessary to collect and record data required by the test programs and as directed by Joint Task Force SEVEN. In addition to the primary mission, the task group was responible for the following tasks: (a) Operation of air base facilities at Eniwetok and Bikini Atolls. (b) Operation of an inter-atoll and inter-island (Eniwetok) air transportation system, and operation of an inter-island airlift at Bikini Atoll until relieved by the Marine Helicopter Squadron. (c) Provision of weather reconnaissance, analysis, and forecasting for the Joint Task Force. (d) Provision of search and rescue facilities. (e) Augmentation of tactical and administrative communications. (f) Operation of aircraft control systems on Eniwetok Island and aboard the Command Ship (USS Estes). (g) Provision of aerial re-supply to weather and project islands.

[redacted]

[redacted]

The Test Aircraft Unit was responsible for all test aircraft assigned to the task group; the unit also was responsible for operating and maintaining the task group Briefing Room and for preparing and supervising general and specialized briefings for aircraft crews involved in test operations. Additional briefings for Very Important Persons were also provided by this unit.

The Test Base Unit, using the resources of the 4930th Support Group (Test), was responsible for operation of all air base facilities at Eniwetok and Bikini Atolls, for operation of an inter-island and inter-atoll airlift, for operation of facilities for petroleum, oil, and lubricants, and for the establishment of a field maintenance system. (Maintenance control, however, was a function of Headquarters, Task Group 7.4.)

The Test Services Unit, manned and equipped by Military Air Transport Service, had a variety of responsibilities, among which were weather reporting and reconnaissance, technical and documentary photography, search and rescue, island re-supply support, C-54 airlift, airways and air communication, and operation of the Military Air Transport Service terminal.

These missions were examined and studied by the conferees at the operational planning conference, making possible concrete planning in substantially all areas of test activity.

Aircraft Requirements. The aircraft requirements for REDWING, as disclosed at the operational planning conference in

[redacted]

mid-August, were extensive. In all, 89 aircraft were to be used, a fact which imposed upon the task group many and varied difficulties, particularly in the matter of parking and maintenance. Space on Eniwetok being extremely limited, an aircraft parking plan was imperative. While attempts were made to place aircraft relatively close to their respective operations and maintenance facilities, much study was devoted to placement which would allow uninterrupted participation of aircraft in activity involving the firing of two or three shots in one day. Here, the timing aspect was considered critical.

Major Harry Elmendorf of the Center Operations Directorate had presented in July a proposed parking plan to accommodate some 83 aircraft. Several changes later were made in the plan by the task group, and at the time of the operational planning conference the plan was still not in final form. In October 1955, Colonel Samuel directed the Operations Directorate to examine the capability of the group to change firing plans from one weapon to another on short notice; that is, the capability to change planning for a large shot at Bikini to planning for a small shot at Eniwetok, or vice versa. Taxiing of aircraft being prohibited in most cases, the marshalling of aircraft for this two-shot concept seemed to necessitate numbered parking areas for systematic parking and orderly scheduling of take-offs. The numbering system study for marshalling was ultimately abandoned, however,

[redacted]

and the original plan submitted by Major Elmendorf with modifications was used as a basis for the marshalling procedures.

The plan did not become firm until aircraft began to arrive at Eniwetok in March and April; however, parking designs generally followed the Elmendorf scheme and remained stable throughout the operational period. Aircraft for bomb and canister drops, effects, sampling, early penetration, and weather reconnaissance were situated on ramp spaces on the northwest side of the runway, near the major maintenance installations. Aircraft for rescue, airlift, documentary photography, and ionospheric studies were positioned on the southeast side of the runway, near temporary maintenance facilities. A large ramp area adjacent to the passenger and cargo terminal was retained for use by Military Air Transport Service aircraft and by sample return and Very Important Persons aircraft.

On 15 June 1955, a list was compiled showing the aircraft programmed for REDWING. This list contained some 86 aircraft for the operation; but, it did not indicate a requirement for air drops of weapons. The operational planning conference, however, was effective in providing a more definite expression of aircraft requirements, and in several areas the 15 June listing had made an accurate projection of needs.

The effects program, named as Program 5 and designed to investigate blast, gust, and thermal effects on delivery aircraft,

[redacted]

had requirements for nine instrumented aircraft: a B-47E, a B-52, a B-66, a B-57, two F-84F's, an F-101A, an A3D, and a P2V (of the Naval Air Special Weapons Facility), and an F-89. These aircraft, except the A3D and the P2V, were to be furnished by Wright Air Development Center. The F-89, at the time of the August operational planning conference, appeared definitely to be available for the program; but, in September when arrangements were being made for overseas shipment of short range aircraft, the F-89 was not included among the aircraft listed for transportation, and the aircraft did not participate in the test series.

Three B-47 aircraft, provided by Strategic Air Command, were to take part in REDWING in an indirect bomb damage assessment program, arbitrarily called Program 40 by Task Group 7.4. This requirement remained stable throughout the planning period.

In April 1955, Center informed Air Research and Development Command that B-57A aircraft then available were incapable of performing satisfactorily the sampling mission of REDWING, and therefore requested assignment to the 4926th Test Squadron (Sampling) of six B-57B aircraft. The new series of B-57's was known to require modification before being accepted for the mission, and with this need in mind Center asked that efforts be made to perform the modifications so that delivery to the squadron might be effected no later than 1 November 1955 to permit shakedown, training, and rehearsals before the movement overseas in January 1956.

[redacted]

By August 1955, the B-57B modification program had become a serious problem to the task group, because the program appeared to be progressing too slowly to permit delivery of the aircraft by 1 November. A slippage of the delivery date would reduce the time reserved for training of sampler pilots, who were largely inexperienced in the aircraft and thus might lower safety and efficiency to a marginal level.

At the operational planning conference, delegates were notified that the requirement for an RB-36 sampler controller, previously included on requirements lists for REDWING, was deleted. At least ten F-84G's were available in the 4925th Test Group (Atomic) for sampling duties to augment the B-57's, and no difficulty was expected in the acquisition and participation of these aircraft for REDWING.

On 1 September 1955, Colonel Carl A. Ousley, Commander of the 4926th Test Squadron (Sampling), visited Warner-Robins Air Materiel Area, where the B-57B modification was being performed, to determine a firm delivery date for the aircraft and to investigate the possibility of expediting the modification. He learned that three of the aircraft were to be completed in November and three in December. A subsequent Technical Order change, however, required additional modification of the aircraft, and none could be expected before December, a fact which critically reduced time remaining to perform crew training.

[redacted]

[redacted]

Then, late in November, Colonel Samuel himself visited Warner-Robins Air Materiel Area to discuss the status of the program and to express further the serious need for an early completion date. Two of the aircraft were released within a few days after the visit of the task group Commander. The third B-57B was released later in November and a fourth in December. These four were sufficient for the accomplishment of crew training, although the training schedule was revised to afford training around-the-clock with an attendant high utilization rate of the aircraft. The remaining two aircraft were received finally by the 4925th in January.

A particularly vexatious problem in regard to aircraft requirements for early penetration operations was of great concern to task group planners. The project, designated Project 2.66, was aimed at the study of various effects on manned aircraft flying through high yield atomic clouds soon after weapon detonation, preferably from 30 minutes to two and one-half hours after detonation. Because of inconsistent data obtained in previous penetration exercises, the investigation of early penetration problems in REDWING was to be pursued cautiously, there being unknown quantities of radiation and turbulence inside atomic clouds.

In the 15 June 1955 listing of aircraft programmed for the early cloud penetration project, six B-57B's were indicated.

[redacted]

However, the type of aircraft for the project was not definitely established, and the supplying Air Force agency was not yet known. Strategic Air Command in April had expressed a requirement for penetration information, particularly at altitudes of from 30,000 to 50,000 feet. The upper limit was of especial interest because data obtained early at 50,000 feet in Pacific areas might represent effects to be expected at lower altitudes over the target area. Strategic Air Command indicated that data acquired by B-57's by using "bore-through" techniques would meet their requirements. Because of operational readiness commitments, Strategic Air Command indicated that they could not supply the necessary aircraft or crews. Therefore, an attempt was made to secure Tactical Air Command participation to obtain early penetration data.

Tactical Air Command, when the requirements were made known to them, agreed that they might be able to participate in REDWING. However, late in July, Colonel Samuel was advised by Tactical Air Command that because of operational readiness plans they could not meet the REDWING penetration commitments of twenty penetration missions at a rate of four for each major detonation.

In September, a message from Headquarters United States Air Force to Tactical Air Command asked whether or not Tactical Air Command could furnish six aircraft for three and one-half months,

[redacted] [redacted]

with crew and maintenance personnel without hindrance to the combat readiness program. In reply, Tactical Air Command asserted that only three aircraft could be provided, and these for only three months, a condition entirely unsatisfactory for REDWING. Not only was the number of aircraft insufficient but also the time period was much too brief.

The Tactical Air Command decision was discussed among task group planners, and the technical requirements for the penetration project were carefully reviewed in an attempt to develop an alternate proposal more acceptable to Tactical Air Command. The alternate proposal, contained in a memorandum to the Center Deputy Chief of Staff for Operations, indicated that the penetration project could be accomplished if five B-57 aircraft could be furnished for a period of four months, the aircraft to be in position in the proving ground and ready for operations on 1 April 1956. The task group was willing also to accept, but only if no other proposal were suitable to Tactical Air Command, the commitment of four B-57 aircraft for five months, this proposition presupposing a 100 per cent in-commission rate. If the last proposal of four aircraft were accepted, two T-84G aircraft, although not entirely adequate, would be needed for back-up operations in case of B-57 maintenance difficulty.

In October, several additional alternate overtures were advanced. The first considered the possibility of acquiring two

[redacted]

B-57B aircraft for four and one-half months to allow penetration missions throughout the test period. This alternative was suitable to Strategic Air Command and seemed to fit most nearly the capability of Tactical Air Command. All the proposals were essentially equal in aircraft-months to the use of three aircraft for three months.

Colonel Samuel was called in November to a conference at Headquarters United States Air Force, which had been arranged through considerable effort by Brigadier General Perry B. Griffith, the Joint Task Force SEVEN Deputy for Air. At the conference the Headquarters Air Force representatives agreed substantially with the proposals of Colonel Samuel to meet the penetration requirements, and Tactical Air Command was directed to furnish five B-57B aircraft, 21 pilots and navigators, and the necessary support personnel for the REDWING series.

Tactical Air Command, upon assuming the responsibility for providing the B-57's, further delegated the obligation to the 405th Bomb Wing to furnish two aircraft and to hold a spare in readiness, and the 461st Bomb Wing to furnish three aircraft.

Instrumentation with recording gear on the B-57's was finished in February 1956, and the aircraft arrived in the proving ground in April 1956.

At the August operational planning conference, the requirement for a C-97 from Cambridge Research Center for ionospheric

[redacted]

study was made known. This project, called Program 6.3, was to be concerned with the study of effects of nuclear discharge on the ionosphere, with the recording of ionospheric wind and wave measurements taken in the general area of Eniwetok Atoll, and with assistance to a secondary project (Ultrasonics) in observing and recording signals emanating from nuclear detonations at ever increasing distances from ground zero so as to determine the maximum distance at which these signals might be discerned and recorded. The requirement, by Cambridge Research Center, remained stable throughout the planning period, and the instrumented C-97 aircraft with its crew was furnished by that Center.

The matter of deciding upon aircraft for the two air drops of weapons was an extended and particularly troublesome problem, until its final resolution in October 1955. In May 1955, the Center attacked the problem of the drop of a free fall [redacted] weapon [redacted] detonated at a scaled burst height of 300 feet and delivered by a B-36. Study of the problem included also the possibility of using a 100-second drogue parachute technique and delivery of the weapon by a B-47 type aircraft. The weapon ultimately was known as CHEROKEE, and was to be detonated in the Bikini lagoon.

When the task group Concept of Operations was published on 30 June 1955, the Bomb Drop Element was expected to consist of

[redacted]

two B-36's. The element was to be manned and equipped by the Air Force Special Weapons Center, which would be responsible also for training of the air crews.

By late July 1955, information on the CHEROKEE air drop became more concrete: the weapon, [redacted] was to be detonated at 5,000 feet, about 15 April 1956. The B-36 was still designated as the carrier, and another B-36 was to be used for stand-by. Yet undecided was the mode of delivery; however, both free-fall and drogue parachute techniques were under study.

In late August 1955, the Center Research Directorate informed the task group that preliminary data indicated the free fall drop from a B-36 type aircraft would involve marginal escape factors because of thermal effects. The use of a B-47 also involved marginal factors. Because of the critical aspects in the preferred free-fall drop, Colonel Samuel on 1 September eliminated the B-36 from consideration.

Wright Air Development Center in October advised the task group that Center had made effects estimates on B-52 type aircraft for another Air Force organization, which indicated that the B-52 was capable of the CHEROKEE drop. Therefore, future study of the problem should include the possibility of using a B-52. Additional study, then, was conducted on both the B-47 and the B-52, and although both aircraft were deemed capable of

[redacted]

safely accomplishing the drop mission using a free-fall technique, the B-52 was preferred from both thermal and gust loading standpoints.

Therefore, in October, the 4925th Test Group (Atomic) was directed to provide a primary and a secondary B-52 for the mission, the primary aircraft being already available and the secondary aircraft due for immediate delivery to the Group. Training was underway before the final decision was made. A B-47 was to be available should further study or tests disclose any deficiencies of the B-52.

The second B-52 was assigned to the 4925th in December and soon afterward was included in the training phase. Both B-52's arrived in the proving ground in mid-April and continued training exercises, until the completion late in the month of two CHEROKEE dress rehearsals.

Very closely related to the CHEROKEE weapon drop was the requirement for the drop of 16 canisters (containing telemetering instruments) over ground zero prior to the CHEROKEE detonation. Until August 1955, B-29 and B-50 types of aircraft were under consideration for the canister drop; but, because of critical escape requirements, these types were eliminated from planning, and study was concentrated on B-36 and B-47 types. A B-36 was selected tentatively in September, and after several successful

[redacted]

practice canister releases, the selection was confirmed in October. The B-36 was to be provided and manned from Special Weapons Center resources.

The planning for the drop of a smaller device, designated OSAGE, [redacted] presented no great requirements problem. Early after re-manning of Task Group 7.4, feasibility studies of B-36 and B-47 aircraft for a free-fall drop of OSAGE and of an F-84 for a low altitude bombing system delivery of OSAGE, were begun.

Early programming for aircraft for weather reconnaissance was begun before the task group was re-manned. The requirement on 15 June 1955 was set at ten WB-50 aircraft, to be acquired from Air Weather Service. This requirement remained stable throughout the planning period, and the aircraft were provided by the 55th Weather Reconnaissance Squadron, McClellan Air Force Base, California, arriving in the proving ground in March 1955.

The requirement for technical photography aircraft was not listed in the 15 June 1955 programming schedule, and no firm need for technical photography had been declared in previous programming plans. However, at the August operational planning conference, Lieutenant Colonel Jack James of Weapons Effects Test Division, Armed Forces Special Weapons Project, placed a requirement for three RB-50 or RB-36 aircraft to fulfill such a mission.

[redacted]

In September three RB-50's were made available from the 6007th Reconnaissance Group in Japan. Some early difficulty was encountered in modifying the aircraft for REDWING use, but this obstacle was overcome before the aircraft arrived at Eniwetok in March.

When the task group Concept of Operations was published on 30 June 1955, three C-54 aircraft for documentary photography were among the listed requirements. According to the concept, the Documentary Photography Element was to be manned, trained, and equipped by the Special Weapons Center to support Lookout Mountain Laboratory projects. However, at the August 1955 operational planning conference, the conferees were informed that a requirement for documentary photography had not yet been made firm and that the project would be deleted if no need for it was found to exist.

Late in September, the Commander, Joint Task Force SEVEN, informed the task group that documentary photography definitely would be a part of the test program, although more limited than in previous operations. While the proposed magnitude of the photography effort was under study, some consideration was being given to the possibility of utilizing the C-54 aircraft for two other concomitant missions, supplementary airlift and airborne communications relay. No precise planning, however, for these

[redacted]

two missions could be made until a decision on the documentary photography effort was reached.

In October and November 1955, study of the problem included the feasibility of using C-47 type aircraft for photography. The Commander, Lookout Mountain Laboratory, however, expressed the opinion that C-47's could not satisfy his requirements and insisted upon the use of C-54's. Colonel Samuel, while concurring with the proposal to use C-54's but aiming at limiting the number of aircraft in the proving ground, stipulated that the primary mission of the C-54's must be to support airlift requirements, and during shot days one airborne C-54 must serve as a very high frequency communication relay.

Finally, on 2 December 1955, after reception of the concrete Joint Task Force SEVEN requirement from Lookout Mountain Laboratory, the task group requested the Center to provide the three C-54 aircraft with crews and support personnel, for the combined mission of airlift, documentary photography, and communications relay, to be operationally ready by 5 April 1956. The three aircraft, then located at Kirtland Air Force Base and already modified to suit most of the task group requirements, were in the process of transfer to Air Pictorial and Charting Service, an organization under Military Air Transport Service. Late in December, Headquarters United States Air Force directed the receiving

[redacted]

organization to furnish the aircraft for participation in REDWING. The aircraft underwent further modification in the early months of 1956 and arrived in the proving ground in March with crews from the Air Pictorial and Charting Service.

One of the principal objectives of Task Group 7.4 in the REDWING series was to operate an inter-atoll and inter-island air transportation system. To meet this objective, the Programming Plan published by the Special Weapons Center on 9 May 1955, listed four C-47 aircraft for inter-atoll airlift, and eight L-20's and nine H-19's for inter-island airlift. Three usable H-19's as well as six L-20's and four C-47's were already in operation by the 4930th Support Group (Test) at Eniwetok, and on 25 March 1955 the Center had requested of Air Research and Development Command the assignment of six other H-19's. The helicopters were to be used in both the Eniwetok and Bikini Atoll areas, until 15 March 1956 when a Marine helicopter squadron was to became responsible for the airlift at Bikini, permitting use of all the Air Force helicopters at Eniwetok.

Besides these aircraft requirements, an additional need was expressed in the programmed aircraft list of 15 June 1955, for three SA-16 aircraft to support the weather island installations, while simultaneously being available for air rescue.

Two extra L-20 aircraft were requested in September to provide

[redacted]

adequate supplemental airlift during peak periods. The two L-20's were shipped to the proving ground by surface carrier in March.

In September 1955, a study disclosed that airlift requirements for REDWING were expected to increase over those for CASTLE by some 30 per cent, a fact which made necessary the planning for an additional requirement of an equivalent of two C-47's. This need could be met by the use of a documentary photography C-54. A request for the two C-47's or one C-54 in September was held by Center without action pending a decision on the documentary photography requirement. This question, however, was resolved when the photography requirement was made final in December and the three C-54's were made available for airlift as well as for photography and communications relay.

During December 1955, in discussions between the Commanders of Air Research and Development Command and Tactical Air Command, the latter agreed to assume the responsibility for helicopter operations in the proving ground, using ten H-19B aircraft. These aircraft arrived for duty at Eniwetok in January and February 1956, replacing the older H-19's then in use by the 4930th Support Group (Test), which were returned to the Zone of Interior on the same C-124's that were used to carry the Tactical Air Command H-19's to Eniwetok.

Thus, when the operational phase of REDWING began, eight L-20's and ten H-19's were available for inter-island airlift,

[redacted]

four C-47's and three C-54's were on hand for inter-atoll airlift, and three SA-16's were ready for weather island re-supply as well as air rescue duty.

The earliest planning for REDWING included a requirement of four SA-16 aircraft for air rescue purposes. This requirement remained the same during the planning period, and the required aircraft were obtained from the 49th Air Rescue Squadron, Selfridge Air Force Base, Michigan, and were flown to Eniwetok in March. Thus, seven SA-16's were in place at Eniwetok at the beginning of the operational phase of REDWING.

Two-Shot Concept. Early in the planning phase of Operation REDWING, there appeared the possibility that two shots would be fired on the same day. For example, three devices, CHEROKEE, LACROSSE, and YUMA, were scheduled to be ready for firing on 1 May. Because of the indefinite shot schedule presented by Task Group 7.1 in the early stages of planning, no firm philosophy could be developed by Task Group 7.4 for Air Force participation in two shots on one day, although this possibility had been acknowledged as early as July 1955. Early in October, Task Group 7.4 requested from Task Group 7.1 a delineation of policy in regard to the feasibility of firing two shots within a 24-hour period so that the two-shot concept might be studied in light of Air Force capabilities. This concept was understood to mean the firing of one shot at

[redacted]

Eniwetok Atoll and one shot at Bikini Atoll on the same day. Information was needed from the Scientific Task Group especially for aircraft control, the planning of aircraft maintenance, refueling support, crew briefings, and marshalling of aircraft. The primary considerations for planning were the time intervals between H-hours and the time when the shot location decision would be made.

On 26 October, Colonel Samuel met with Dr. William E. Ogle, Alternate J Division Leader at Los Alamos Scientific Laboratory, to discuss the concept more fully. Dr. Ogle informed Colonel Samuel that the concept was concerned with the firing of two weapons within a short period of time, perhaps within a 30-minute period. This definition differed somewhat from the one understood by Task Group 7.4, for Task Group 7.4 perceived it to mean the detonation of one shot in the morning and the other in the afternoon. Dr. Ogle believed that only two devices seemed capable of fitting the Scientific Group concept and that such an operation probably would not even be performed during REDWING.

Colonel Samuel, however, directed his staff to investigate the potentialites of the group in relation to the concept, and planning was begun immediately on a ground refueling system and a turn-around maintenance schedule to be used should two shots be fired concurrently.

[redacted]

AFWL/HO

The study on a ground refueling system was aimed fundamentally at determining the capabilities of Task Group 7.4 to refuel aircraft on a turn-around basis. For purposes of the study, an assumption was made that all effects and test aircraft would be engaging in both shots. To determine, then, the variables involved, a tentative refueling plan was formulated and related to time-study data which had been calculated by the Petroleum Officer, Kirtland Air Force Base. After making allowances for aircraft dispersion and for physical characteristics of Eniwetok aprons and refueling pits, the data were accepted as valid criteria for further definite planning.

The study revealed that ten F-6 refueling units could refuel all effects and test aircraft in one hour and thirty-five minutes, nine F-6 units in one hour and fifty minutes, and eight F-6 units (the most probable number in commission) in two hours and five minutes. This information showed the need of a precise refueling plan inasmuch as failure to program refueling would add some 40 minutes to the time necessary for readying aircraft for a second shot. Adding approximately 45 minutes for other servicing operations, such as oxygen servicing, check-out of aircraft systems and test equipment, and pre-take-off marshalling, the minimum turn-around time was reckoned at three hours. This calculation did not apply to sampling and penetration aircraft which would require decontamination.

[redacted]

An aircraft maintenance plan, establishing a Maintenance Control Unit, was formulated and published in November, having as its purpose the coordinated use of maintenance facilities which would afford the most economical and efficient utilization of these facilities and of personnel. A portion of the plan was directed toward the two-shot concept, making provisions for servicing of aircraft with fuel, oil, and oxygen, and for scheduling of decontamination activities.

When Operations Plan 1-56 was published on 15 February 1956, the dual shot capability of Task Group 7.4 was briefly outlined. The plan assumed that, if two shots were detonated on one day, the major portion of aircraft would be concerned with the larger yield device at Bikini, and a minimum of participation could be expected for the Eniwetok event. The greatest problem facing the task group (disregarding maintenance problems) was realized to be air control in the Eniwetok area. This problem would evolve from the necessity of aircraft with critical fuel supply. Air control could be accomplished successfully only by rigidly adhering to take-off and landing schedules. These schedules ultimately were based upon information discussed in the positioning conferences prior to shot days. That dual shot planning was successful is illustrated by the fact that on

[redacted]

two different occasions two shots were ultimately fired on the same day, and no malfunctions of the various systems of the concept occurred.

Air Operations Control. Much planning on air operations control in the proving ground had already been accomplished by Special Weapons Center personnel when the task group began remanning. A concept for the Air Operations Center, actually a refinement of the concept used for CASTLE, was developed by Major John A. deVries, at that time a member of the 4925th Test Group (Atomic) Field Office. This concept, with its revisions, formed the basis for the air control system defined in Operations Plan 1-56, 15 February 1956. It provided fundamentally for the use of one "set" of eight Air Force controllers to man both the Air Operations Center and the Combat Information Center, depending on the atoll concerned.

During CASTLE, undeveloped operational procedures and duplication in many aspects of the air control effort were particularly apparent in the single Eniwetok shot. Air control facilities and procedures for REDWING, however, followed the general pattern established for CASTLE, the need for a ground control station at Eniwetok and a ship-borne control facility at Bikini having been proven by the CASTLE tests.

For REDWING, movement of all aircraft in the proving ground air control area was to be controlled by the Air

[redacted]

Operations Center (MANHUNT) on Eniwetok and the Combat Information Center (BARRYMORE) aboard the USS Estes in the Bikini Atoll area. Both centers were to be supervised by Air Force controllers. All aircraft entering the proving ground air control area during other than shot and rehearsal periods were to be under the supervision of the Air Operations Center. Therefore, installations of Mark 10 Identification Friend or Foe (IFF) transponders in all aircraft except H-19 and L-20 aircraft and installation of ultra high frequency radio in all aircraft entering into or operating in the proving ground, was required.

Control facilities were established to provide dual air control capability for devices fired at either Bikini or Eniwetok Atolls. The air control system included provision for supervision and coordination of the operations of the Eniwetok Control Tower, Base Operations, Ground Control Approach, the ultra high and very high frequency Direction Finder equipment, Search and Rescue Operations, MSQ-1A control, and control of aircraft in the area using the AN/USQ-12 Air Operations Control System.

All flight paths of aircraft participating in shots in the Eniwetok area were to be monitored by the Air Operations Center, and MSQ-1A radar was to be utilized for precise control and positioning of critically placed aircraft. For Bikini shots, the Air Operations Center was to control the aircraft from Eniwetok to within 90 miles of Bikini, where the Combat Information

[redacted]

Center would assume control. Critically positioned aircraft in the Bikini area were to be controlled by Raydist, monitored by the USS Estes control system. Upon return to Eniwetok from Bikini, all aircraft were to be released by the Combat Information Center to the control of the Air Operations Center, until further release to the control tower for landing.

Communications readiness had proved in CASTLE to be a problem of vast proportions, especially for operations in the early part of the test period. Thus, for REDWING, all air control communications channels were to be installed and thoroughly tested 30 days prior to the beginning of the operational phase of REDWING. The procurement and manufacture of equipment were problems which had prevented early testing and operation of the control system during CASTLE.

In the preparation for Operation TEAPOT and CASTLE, the Air Operations Control positioning equipment was manufactured in the shops of the 4925th Test Group (Atomic). These shops, however, were not manned or equipped to fabricate developmental electronic gear as complex as the UPX-7, UPX-1, and UPX-4 systems, planned for use in the REDWING Air Operations Center. A determination, therefore, was made early that the IFF system should be developed and installed on a contract basis. The contractor, it was thought, should be able to build and deliver an integrated

[redacted]

and installed control system within six months and should provide for assignment of a field engineer to the task group to afford constant and skilled maintenance of the equipment.

Special Weapons Center personnel had determined in early June that Joint Task Force SEVEN funds primarily and Air Research and Development Command funds secondarily would be available for construction and procurement of Air Operations Center equipment but that an attempt should be made to have the equipment fabricated by an Air Force agency.

Task Group 7.4 representatives on 15 June attended a conference at Rome Air Depot to discuss procurement of the equipment. The task group conferees estimated that approximately $80,000 would be needed to obtain the desired equipment. The Rome representatives, however, established the fact that the Depot had neither the facilities nor personnel to manufacture the equipment. Nor were the desired communications consoles available except through contractural construction requiring at least three months of study, negotiation, and engineering.

A possible solution to the problem was found before the task group conferees departed from Rome Air Depot. The Rome Auxiliary Equipment Laboratory displayed a new controller's console, the AN/UPA-35 indicator, manufactured by Hazeltine Electronics Corporation of Long Island, New York. The console

[redacted]

seemed to contain all the features desired by the test controllers. Cost of each indicator was $6,000, and some 245 indicators were in storage awaiting distribution to Air Force consignees. Assignment of the indicators, however, had already been decided by Headquarters United States Air Force, but there appeared a possibility that eight of the indicators might be diverted for use by Task Group 7.4.

In July 1955, events moved rapidly toward the acquisition of the required equipment. Rome Air Development Center informed the task group Commander that both Air Research and Development Command and Joint Task Force SEVEN had granted them authority to proceed with contracting for the equipment and for making preliminary engineering plans.

A contractor conference was held on 18 July at Rome Air Depot, at which task group personnel described for the contractor representatives the needs and technical aspects of the Air Operations Center. Hazeltine, Ultrasonics, and Millcraft Corporations indicated that they would submit contract bids for the construction of the equipment.

On 26 July, Air Force released eight AN/UPA-35 (Universal) indicators for use by Task Group 7.4. This action, thus, relieved much of the pressure of the problem and allowed the firming of plans for preparation of the entire equipment. Some

[redacted]

delay was encountered before the contract was let to Hazeltine, the letter of intent from Rome Air Development Center being received by Hazeltine on 22 September 1955.

The Hazeltine Electronics Corporation was known to be a long established engineering corporation with excellent manufacturing facilities. Having been a leader in the development of Mark III, Mark V, and Mark X IFF equipment, Hazeltine seemed eminently qualified to construct the REDWING control equipment, although the corporation preferred to work with production items rather than with developmental equipment.

Early in October, at a conference between Hazeltine and Task Group 7.4 representatives, virtually all outstanding requirements problems were resolved, and engineering designing was begun. A complete check of the constructed equipment was scheduled tentatively for January or February 1956. The Hazeltine representatives indicated that the corporation had undertaken the job as much for prestige as for other considerations; they displayed a warm inclination to insure the best possible operation of the equipment and expressed a desire to furnish a field representative to assist in installation and maintenance of the equipment in the proving ground. They agreed also to furnish suitable test equipment for maintenance and to provide one set of operating spare parts.

[redacted]

In mid-December, progress on the construction was satisfactory, and delivery of the equipment was assured by 16 February 1956. The corporation had already expended some $45,000 in time and materials although Rome Air Development Center had not yet provided contractural coverage. Since the work was progressing well, a staff sergeant from Cambridge Research Center, manning a Radar Repair Technician space in Task Group 7.4, was sent to the factory in December to observe and assist in construction for familiarization purposes.

The acceptance check of the equipment, officially identified as AN/USQ-12, was conducted by Task Group 7.4 early in January 1956 at the factory, showing that the apparatus gave effective coverage up to 250 miles. Shortly thereafter, the equipment was packed and transported to Kirtland Air Force Base, from where it was sent to the proving ground, arriving at Eniwetok on 18 February.

The original $80,000, estimated by task group personnel in June 1955 to pay for the equipment, was not sufficient to cover all costs. Thus an additional $13,500 was acquired from Joint Task Force SEVEN in February and was dispatched to Rome Air Development Center for compensation to Hazeltine. The total cost of the fabrication and transportation of the equipment to Kirtland from New York was approximately $93,575.

[redacted]

One of the most troublesome aspects of establishing the Air Operations Center involved the site preparation by Holmes and Narver in Building 90 at Eniwetok. As late as 31 December modification and construction at the site had not begun, mainly because of delays in review of plans for cost estimates, although electrical and mechanical equipment parts, including heat removal ducts, plotting boards, and cabinet work, were under construction in Los Angeles by Holmes and Narver. Site modification and construction finally began late in February and was completed partially on 6 March. Four days later, the AN/USQ-12 control system was fully installed, with the assistance of a Hazeltine technician. The heat evacuation system, although installed by Holmes and Narver in March, failed to function satisfactorily and continued to impede full operational use of the Center until early April.

The first operational test of the Air Operations Center was conducted on 6 April, and only minor functional discrepancies were noted, requiring routine adjustments. Plotting boards constructed by Holmes and Narver, did not arrive at Eniwetok until 15 April, when immediate assembly was started; but, this delay caused no appreciable retarding of the Center's operations checks.

Inasmuch as Air Force controllers would operate the Combat Information Center aboard the USS Estes, planning began in October 1955 for a testing of that system in January 1956. An area

[redacted]

of operations for the check was cleared southwest of San Clemente Island, off the California coast, and the necessary arrangements were completed with the Western Air Defense Force, the 27th Air Division, and Joint Task Force SEVEN for permission to use all modes of IFF during the check.

The check was made early in January 1956. Three B-57 and two F-84 aircraft of the 4925th Test Group (Atomic) were temporarily based at Miramar Naval Air Station, San Diego, and they, together with Navy and Air Defense Command aircraft, were used for the airborne counterpart of the test. Task Group 7.4 controllers, who were to be aboard the ship in the proving ground, participated in the check. Adequate IFF return and radio communications at 45,000 feet altitude to a distance of 140 miles was established in the check. All USS Estes equipment and facilities were determined to be satisfactory.

An effective proving ground test of the USS Estes facilities, in conjunction with operation of the Air Operations Center at Eniwetok, was performed on 12 April 1956 and only minor discrepancies were apparent. A further test was held on 16 April, and operation of the Combat Information Center showed definite improvement, as it did in succeeding rehearsals. The complete control system including communications was in excellent condition when the operational phase of REDWING got underway.

[redacted]

[redacted]

Plans for Air Drops of Weapons. In a letter[6] on 24 February 1955, Dr. Alvin C. Graves of Los Alamos Scientific Laboratory mentioned the possibility of an air drop of a weapon in the megaton range during the REDWING series. When Programming Plan 3-55 was published by the Special Weapons Center on 9 May 1955, the air drop was listed among the devices to be fired in the Bikini Atoll area.

The shot was expected [redacted] but the height of burst was not fully determined. To produce fall-out results reasonably typical of continental conditions, the shot should occur over a land surface. Only a single small island, Namu or CHARLIE, in the Bikini Atoll appeared to be available and satisfactory, although its dimensions were so small as to place severe restrictions on allowable circular error. The desired height of burst was expected to be in the range of 1 to 1.5 fireball radii, to test effectively the hypothesis that there would be no significant fall-out if the fireball did not intercept the ground.

On 5 May, however, some concrete recommendations were made by the Center to Air Research and Development Command in relation to the drop.[7] The Center recommended that the mission involve a free-fall [redacted] weapon [redacted] detonated at a scaled burst height of 300 feet, delivered by a B-36 aircraft.

[redacted]

[redacted] The 300-foot burst height was expected to give pertinent information on thermal radiation and contamination. The most accurate delivery system then was thought to be a free-fall drop from a B-36.

Center calculations indicated that a weapon [redacted] could be dropped safely by free-fall from 40,000 feet to the burst point of 300 feet, but provision for a safety margin was advisable. The optimum burst height [redacted] was thought to be approximately 5,000 feet; [redacted] a 7,500 foot burst height seemed best.

Air Research and Development Command had indicated earlier that [redacted] device would be available, [redacted] Center, thus, suggested that no matter what the yield, the height of burst should be scaled to 300 feet, using a drogue parachute technique rather than a free-fall delivery. The [redacted] weapon could be delivered safely with a 100-second drogue, [redacted] At Edwards Air Force Base, tests on seven drops, using a 100-second drogue, had given an average circular error of 900 feet. By free-fall from a B-36 at 40,000 feet, a circular error of 375 feet appeared attainable. -

[redacted]

The first indication of a second drop was given in late July 1955 in a letter[8] from Colonel Samuel to the Commander, 4925th Test Group (Atomic). The letter stated that the shot schedule included two air drops by a B-36 of the 4925th, these shots to precede other REDWING shots, the first on approximately 15 April 1956 and the second some seven days later. The first drop was to involve CHEROKEE, [redacted] to be detonated at 5,000 feet altitude at Bikini. The second drop, later called OSAGE, [redacted] to be delivered on an Eniwetok Atoll target, the burst height for which was not yet known. OSAGE had been defined in the Operations Concept on 30 June 1955 as a 300-foot tower shot at Runit Island. The method of delivery of CHEROKEE was still not specified.

In late August 1955, the Special Weapons Center Research Directorate informed the task group that preliminary calculations showed the use of a B-36 aircraft for the drop of CHEROKEE would involve critical escape factors because of thermal effects. The B-36, then, was removed from consideration for a free-fall delivery, and the utilization of either a B-47 or a B-52 came under investigation.* In October, the B-52 was selected for the CHEROKEE

---

* See pp. 26-27.

[redacted]

test because of its better capability to escape thermal and gust loading effects, although the B-47 was deemed marginally capable of the delivery. The selection of the B-52 also made firm the plan to deliver the weapon by free-fall from 40,000 feet to a burst height of 5,000 feet.

The problem of escape for the canister drop B-36 was a matter of great importance and was not completely resolved until February 1956. After extensive studies of gust and thermal effects expected of CHEROKEE, Task Group 7.4 decided to employ a maneuver in which the B-36 would perform a shallow 100-second dive to gain maximum speed, followed by straight-away flight at normal rated power.

The first combined training mission of the B-36 and the B-52 drop aircraft was performed in early March 1956, followed by other teamed and individual rehearsal performances in March and April originating from Kirtland Air Force Base.

The Drop and Canister Element, consisting of two B-52's and the B-36, arrived in the proving ground on 14 April 1956 and immediately resumed training missions, using Sifo Island in the Ailinginae Atoll as a primary practice bombing range and Bokonikaiaru Island in the same atoll as a secondary range. Permission for the use of these islands was granted by the United States Trust Territories Commissioner at Kwajalein Naval Air Station.

[redacted]

Rehearsals. The need for air rehearsals was established by tests previous to REDWING. During previous tests, however, one or more rehearsals were conducted in the Zone of Interior. Their operational value was questioned by REDWING planners, inasmuch as they were extremely costly and required development of a complete set of unnecessary plans unrelated to the actual tests. Stateside rehearsals in previous tests required also additional movement and handling of delicate communications equipment and participation of test array aircraft, although such rehearsals could accomplish no more than a communications and IFF check for the Combat Information Center. The prospect of Zone of Interior rehearsals for REDWING again presented the same problems as were experienced for other test series, complicated further by the certainty of incpmplete participation caused by lagging aircraft modification schedules and other factors.

Because of these facts, the only Zone of Interior rehearsal for REDWING was limited to the check of communications and radar equipment of the Combat Information Center on the USS Estes which had just completed a yard repair and overhaul. Five Air Force aircraft, supplemented by eight Navy aircraft, participated in the check to simulate communications saturation.

A similar but even more limited exercise, involving one B-57 aircraft, was held in the New York area to test the functioning of the new Air Operations Center equipment.

[redacted]

Seven full-scale shot rehearsals were conducted in April 1956, and another, a limited CHEROKEE dry run, in May. These rehearsals were instrumental in the formulation of techniques and procedures for the actual shots and in the peaking of communications and control facilities. From the rehearsals, Task Group 7.4 established abort procedures and criteria, precise positioning policies, firm controller procedures, coordination between the gross positioning agencies (Air Operations Center and Combat Information Center) and the precise positioning units for test aircraft (MSQ-1A and Raydist), firm parking, take-off, and landing procedures, and safety procedures.

On 6 April, the date of the first REDWING rehearsal, 23 aircraft participated in a dry run for LACROSSE in the Eniwetok Atoll, with an H-hour of 1000 hours. Three aircraft aborted: an SA-16, STABLE I, because of a fuel leak; an F-84F, WAITER, because of electrical difficulty; and, an RB-50, CARTER, because of engine malfunction. The B-66, CLARK, cancelled its mission because of a cracked canopy. Air Operations Control functions were performed with only minor discrepancies, including some error in control tactics and difficulty in interchanging of radio control channels. Although the first rehearsal was satisfactory, the need became apparent for definite abort procedures for all aircraft not critically positioned as well as

[redacted]

for those critically positioned.

On the following day, a conference was held by the task group, and included representatives from the Wright Air Development Center Effects Element and from the Navy Effects Element, to discuss abort procedures of critically positioned aircraft. Basically, the issue centered on the pre-determination of a line available to controllers on the controller scopes by which controllers could estimate aircraft positioning accuracy at any given time. In establishing this line for each aircraft, decisions were based on the expected shot yield, aircraft speed and altitude, aircraft rate of turn, and ability of aircraft to accelerate or decelerate.

From a second conference on 27 April, the abort criteria were fully developed and were used for all actual shots without adverse incident.

FLATHEAD, a Bikini event, the second REDWING dry run, was rehearsed on 12 April, at an H-hour of 0750. Only 19 aircraft were scheduled to participate, but four of these were cancelled and three aborted. The four cancellations included the following: (a) The effects B-47, SHELDON, because of a poor and variable wind factor which made the computed take-off distance too long for the Eniwetok runway. (b) A Documentary Photography C-54, PEWTER II, because of inability to start one engine. (c) The effects B-66, CLARK, which was out of commission for lack of a

[redacted]

canopy. (d) The Effects B-57, KIMONO, because of an engine change.

The three aborts involved an SA-16, STABLE I, because of an inoperative ultra high frequency radio channel; the effects Side Loads F-84F, BARLEY, because of Raydist difficulty; and, the effects Capability F-84F, WAITER, because of an engine malfunction.

Despite the cancellations and aborts, the FLATHEAD rehearsal was described as an effective test of the Combat Information Center and of the general control system.

A ZUNI rehearsal, the third of the REDWING rehearsals, was performed on 16 April, a Bikini event controlled primarily by the Combat Information Center, BARRYMORE. Twenty-six aircraft were scheduled for participation; however, two cancelled (the effects B-52, JAYBIRD, for instrumentation trouble; and, the effects B-66, CLARK, again because of a cracked canopy) and one aborted (the effects A3D, LENA, because of controller error). Several simulated emergency procedures were rehearsed by both the Air Operations Center and the Combat Information Center, all of which were successfully accomplished. The Raydist positioning system was inoperative for the mission, but to prevent aborts on this rehearsal, the positioning was conducted by BARRYMORE.

The fourth REDWING rehearsal was for MOHAWK, having an H-hour of 0625 on 18 April, in the Eniwetok Atoll. This was the most successful of all rehearsals to that date, although the

[redacted] [redacted]

three B-47's (HARDTIME I, II, and III) of the Indirect Bomb Damage Assessment Element were cancelled because of failure of the aircraft's water injection system. Thirteen other aircraft participated. The most significant weakness of the rehearsal was the unreadability of the voice-time countdown.

A second rehearsal for ZUNI, the fifth REDWING practice, occurred on 21 April at an H-hour of 0610. Aircraft control was maintained by the Combat Information Center in the Bikini area. Twenty-eight aircraft were scheduled for the operation. Five effects aircraft were cancelled because of non-readiness of the Raydist system, and three other aircraft aborted because of mechanical failures. Except for minor imperfections, however, the operation was declared entirely satisfactory, especially in regard to control procedures and tactics.

On 24 April, the sixth REDWING rehearsal and the first of two for CHEROKEE, was conducted in conjunction with a rehearsal for INCA, the largest scale event to that date. In this dual dry run, 36 aircraft were scheduled for CHEROKEE at Bikini Atoll and 6 for INCA at Eniwetok Atoll. Two of the CHEROKEE aircraft cancelled (an effects F-84F, WAITER, because the aircraft was out of commission, and the Navy Effects Element A3D, LENA, which was undergoing maintenance), and one aborted (an SA-16, STABLE I, because of IFF failure).

[redacted]

Communications difficulties between the bomb drop and the canister drop aircraft, the Combat Information Center, and Station 70 (firing bunker) were troublesome. The two aircraft had to change from ultra high frequency to high frequency and finally to very high frequency radio in order to establish communications with the Combat Information Center, inasmuch as monitoring and transmitting could not be performed on one system. Major George L. Trimble, of the task group Operations Directorate, transmitted from the Combat Information Center the final 30 minutes of the countdown over 245.0 megacycles to all aircraft except the canister drop aircraft. Because of this difficulty, Colonel Samuel directed that duplicate ultra high frequency radio systems be placed in both the canister drop and the bomb drop aircraft.

A definite improvement in communications was experienced in the second CHEROKEE rehearsal, the seventh for REDWING, on 28 April in which 21 aircraft took part. No aborts or significant cancellations occurred. The aircraft again were controlled from the Combat Information Center.

On 4 May, a final CHEROKEE rehearsal was held. This being a timing mission, only the bomb drop B-52 and the canister drop B-36 participated. On the first simulated H-hour, the timing error was 15 seconds, and on the second the error was 10 seconds. Target sighting both visually and by radar was reported by the bombardiers to be excellent.

[redacted]

[redacted]

Of special importance during the series of rehearsals was the finding and remedying of problems in the communications net. Early pinpointing of malfunctions made possible the optimum uninterrupted performance of the integrated communications systems throughout the tests.

In conjunction with the rehearsals, the Director of Operations conducted two practice positioning conferences, the first for ZUNI and the second for CHEROKEE. These conferences were aimed primarily at fixing and coordinating changes of positions and flight patterns and at isolating and resolving individual problems.

Air Force Construction in the Proving Ground. In the Task Group 7.4 Concept of Operations, published shortly after the remanning of the group, construction in the proving ground was declared to be a responsibility of Joint Task Force SEVEN, as had been the case in operations previous to REDWING. Therefore, Air Force recommendations for additional construction were to be submitted to the Commander of the Joint Task Force for action.

Early in July 1955, the 4930th Support Group (Test) at Eniwetok was directed to conduct an immediate survey of all Air Force buildings on Eniwetok to determine their adequacy for use during REDWING. Some difficulty appeared certain in regard to the lack of ample working and housekeeping areas and facilities.

[redacted]

The 4930th determined that only approximately 21,000 square feet of space was available for administrative functions, that housekeeping space was severely limited and would have a definite effect upon the number of personnel capable of being accommodated, and that the lack of maintenance areas and facilities would necessitate efficient and coordinated planning. Some new construction was then underway, which would solve many of the problems concerned with the lack of working space; however, this construction, if completed before the beginning of REDWING, would not alleviate all the space difficulties.

At the conclusion of Operation CASTLE in 1954, the air task group, in coordination with Joint Task Force SEVEN, had given much consideration to future construction on Eniwetok and had developed a Five Year Construction Plan. Seven major requirements were foreseen for REDWING and these requirements were given top priority in the Five Year Plan. These requirements included the following: (a) Airfield improvements. (b) An expansion of the tank farm for petroleum, oil, and lubricants. (c) A building or buildings for headquarters for the three Test Units. (d) Buildings, 50 feet by 100 feet, for the build-up and storage of aircraft engines. (e) An additional prefabricated building, 20 feet by 48 feet, for electronics maintenance. (f) Re-routing and paving of the perimeter road on the south side of the airfield. (g) Some 22,000 feet of additional concrete construction for aircraft decontamination and washing.

[redacted]

In August 1955, Joint Task Force SEVEN was requested to approve and provide funds for construction of 11,000 square yards of parking apron as an addition to the southeast apron, for widening of the taxiway from the northwest apron to the runway adjacent to the decontamination pads, and for constructing access taxiways from the parking apron to the south perimeter road. The necessary funds were provided, and the Atomic Energy Commission directed Holmes and Narver to proceed with the work. Construction was completed in early May 1956.

In 1954 when the tank farm expansion program was conceived, the Eniwetok tank farm was operated by Task Group 7.2; however, as a result of CASTLE studies, the operation was transferred to the 4930th Support Group (Test). The system was originally installed as an expedient measure, meeting no particular construction standards. It was large enough to store operating supplies of Diesel fuel and motor gasoline during operational periods only, leaving bulk aviation gasoline and jet fuel to be stored temporarily in barges. The age and inadequate design characteristics on the farm left much to be accomplished to bring it to Air Force standards.

Active and positive consideration of the expansion was delayed until September 1955, when Air Force, Holmes and Narver, and Atomic Energy Commission representatives conferred to put in final form the design criteria for new construction. Chief among the planned

[redacted]

new construction items were two 10,000-barrel tanks and two 5,000-barrel tanks. The jet fuel and 115/145 aviation gasoline fill stands were to be removed to a position west of the proposed farm addition. At this time, the Air Force representative recommended that the old off-shore unloading lines be replaced with new six-inch lines.

The Atomic Energy Commission in October 1955 authorized Holmes and Narver to begin construction on the tank farm as specified by the design criteria. However, this authorization did not include the replacement of the old fuel lines. Colonel Samuel then initiated a campaign to effect the replacement before the start of the operational period of REDWING. Basing his study of the problem on the inadequacy, and the advanced state of disrepair, of the old lines, Colonel Samuel discussed the problem in detail with Mr. Paul Spain of the Santa Fe Operations Office, a branch of the Atomic Energy Commission. Colonel Samuel, having explored the question with Navy representatives earlier, was prepared to ask for a demonstration of the interest on the matter by the Commander, Service Force for the Pacific Fleet, who had indicated a desire to see the old lines replaced for economical reasons. Late in December 1955, however, Mr. Spain informed Task Group 7.4 that the issue had been studied by the Atomic Energy Commission and that the old lines would be replaced by three six-inch lines.

[redacted]

By late March 1956, the three lines were installed and in use for off-loading activity. The four tanks also were in use, providing over-all storage facilities for 798,000 gallons of aviation gasoline, 82,000 gallons of motor vehicle gasoline, 630,000 gallons of jet (JP-4) fuel, and 166,000 gallons of Diesel fuel. All other construction on the farm, with the exception of minor installations of electrical lines, piping, and panels, was completed early in May 1956.

No outstanding difficulty was encountered in beginning the construction of other structures outlined in the CASTLE Five Year Plan. Work was initiated in September 1955 on the Operations and Administrative Building (Number 679), which was to be used for housing headquarters of the three Test Units, an aircrew briefing room, and a personal equipment room. The building was ready for use in May 1956.

The Aircraft Engine Build-up Building was started in mid-December 1955 and, with the exception of construction of concrete aprons, was ready for utilization before the beginning of the operational phase of REDWING.

Construction on the electronics maintenance shop (Building Number 681) was begun on 13 December 1955, and was completed in May 1956.

Paving of the re-located perimeter road on the south side of the airfield was not accomplished during REDWING, although the

[redacted]

existing paved road was closed to vehicular traffic for use as additional parking space, and a new coral-base road was used. The new road required constant maintenance and often was in poor condition, particularly after rains.

No additional construction was provided for decontamination and washing of aircraft as recommended in the CASTLE Five Year Plan although the existing facilities were rehabilitated to meet the temporary needs of the task group.

Three Air Force warehouses (Buildings Number 648, 649, and 650), though not listed among the CASTLE Five Year Plan critical items, were completed prior to the operational phase of REDWING. Construction on these buildings began after mid-September 1955 and was completed by May 1956.

Discussions in late August 1955 with Field Command, Armed Forces Special Weapons Project, revealed to Task Group 7.4 the possibility of borrowing from the Special Weapons Project seven Complete Assembly Shelters (CAS) for use on Eniwetok during REDWING, a move which was thought to offer a partial solution to the lack of sheltered working space. The buildings were then on loan to Air Force organizations.

Special Weapons Project in October approved a formal request for the loan of the buildings and arranged with Headquarters United States Air Force to make these shelters available or to furnish a

[redacted]

suitable substitute. By late April 1956, the shelters had been acquired from using Air Force organizations, had been transported to the proving ground, and were erected for REDWING use. The shelters proved to be of inestimable value to the task group, reducing significantly the pressure of the sheltered space problem.

Flight Safety. Many factors were present to make flight safety in the proving ground a momentous and persistent problem. The limited size of the airfield at Eniwetok exposed REDWING aircraft to many operational hazards which could not be eliminated. Many structures required for the operation of a flying activity were of necessity required to be sited in violation of established Air Force airfield clearance regulations. This was true of the location of the Control Tower, the Ground Controlled Approach Unit, communications antenna poles, the hangar, and parking aprons. Furthermore, the prospect of the high concentration of aircraft in critical positions on mission days required precise indoctrination and close coordination between aircrews and Air Traffic Control agencies. Consequently, Colonel Samuel early began to emphasize the importance of a well defined and rigid flight safety program.

To meet the requirements of this program, all pilots were to be indoctrinated and thoroughly trained in flight regulations and peculiarities of tropical and night flight in the area of atomic explosions; a Sea-Air Rescue Element was to be constituted with

[redacted]

four SA-16 aircraft for rescue activity, supplemented by the operation of two Air Force surface rescue vessels and an H-19B; and, mechanical devices such as runway barriers were to be installed and maintained in a state of constant readiness.

Among the actions taken and policies established to promote the safe and expeditious flow of air traffic were the following: (a) Policies and procedures were prescribed to govern ground handling of aircraft and operation of motor vehicles in the landing area. (b) Air traffic control procedures were developed and disseminated to all participating agencies. (c) Those obstructions which violated clearance criteria were properly marked and lighted for night operations. (d) Safe positioning of test array aircraft was to be the responsibility of a positioning team composed of Scientific, Air Operations Center, Operations, and Command personnel. (e) A mission execution chart was to be prepared by the Test Aircraft Unit for each mission to assist all personnel concerned in maintaining a safe, orderly flow of aircraft operation from start of engines to landing. (f) A task group Operations Officer was to be stationed in the Control Tower during mission days to coordinate with tower personnel all instructions from the Air Operations Center. (g) Commanders of elements having critical aircraft were to be present in the Control Tower during take-off and landings of their aircraft on test missions, and were to be in possession of information concerning take-off distances, speeds, and other data

[redacted]

which would assist in safe dispatch and recovery of their aircraft. (h) A cart with flashing red lights was to be positioned on the edge of the runway to guide pilots in determining appropriate line speeds during night take-offs.

In August 1955, Lieutenant Colonel Francis B. Carlson, Director of Operations, visited the proving ground and inspected the condition of the Eniwetok runway. The paving appeared to be in good condition, and work was then underway to fill low portions of the runway where water tended to accumulate after heavy rains. The installation of a system of drainage culverts under taxi strips was calculated also to accelerate run-off of water. Shoulders of the runway had recently been reconditioned, increasing the width of the runway to approximately 230 feet. Air drome lighting was satisfactory, and runway and taxi strip lights were already installed and operational.

In mid-September 1955, Major William R. Harmon, Task Group 7.4 Flight Safety Officer, inspected the Eniwetok airfield and found it again to be in good condition, with only minor exceptions. With the installation of adequate caution signs and traffic lights, the control of vehicular traffic across the ends of the runway was expected to present no problem.

Major Harmon expressed a particular interest in the proposed use of runway barriers, especially on the Eniwetok runway. The presence of a wide variety of high performance jet aircraft, plus

[redacted]

the fact that the few available airstrips in the proving ground were short with little or no overrun, made evident the potentialities of the problem of safe aircraft recovery under emergency conditions. Only four airstrips in the proving ground, including the Eniwetok runway, were known to be suitable for operation of jet aircraft in emergency conditions.

During the preliminary planning for REDWING in June and July 1955, a determination had been made that runway barriers would be needed for the Eniwetok strip and for the emergency strip on Enyu Island (NAN) in the Bikini Atoll. The Eniwetok runway, 6,875 feet in length, and the Enyu strip, 4,500 feet in length, could not safely accommodate such aircraft as the F-84 and F-101 during emergency landings without the use of barriers. Doubt existed also that even a barrier would adequately arrest such larger aircraft as the F-101, the B-66, and Navy aircraft; thus, in December 1955, the task group considered installing a barricade and a cross-deck pendant in addition to the barrier on Eniwetok.

In September 1955, action was taken to procure and install one MA-1 type barrier and one Navy type net barrier for the northeast end of Runway 6 on Eniwetok and one MA-1 type for the southeast end of Runway 4 on Enyu Island.

In January 1956, as a result of recommendations made at a conference at Wright Air Development Center, the task group took action to obtain a cross-deck pendant for A3D aircraft and a

[redacted]

barricade for larger aircraft, designed especially to protect B-57 aircraft. Other MA-1 barriers were requisitioned for installation on the emergency strips at PETER-OBOE in the Bikini Atoll and at JANET in the Eniwetok Atoll. The barrier installation at PETER-OBOE would require only a rehabilitation of an existing facility.

By the end of April 1956, the MA-1 barriers on NAN, PETER-OBOE, and JANET were constructed and made operational, although not tested under actual emergency conditions. The Eniwetok barricade installation was completed by Holmes and Narver in April and was placed in operation, as was the cross-deck pendant. The Eniwetok MA-1 barrier installation, however, was found to be unsatisfactory because of the tendency of the net to be raised by jet wash on take-off of aircraft, which imperiled other aircraft on formation take-offs or those aircraft which immediately followed. The problem was resolved in June by the addition of a cable and lock pins which held the barrier flat until released by the operator upon erection of the barrier.

The provision for a Search and Rescue Element was contained in the earliest plans for REDWING aircraft participation. Four SA-16 aircraft were thus made available for such missions, the element's aircraft and personnel being drawn from resources of the 49th Air Rescue Squadron, Selfridge Air Force Base, Michigan. One SA-16 was to be on ground alert at Eniwetok during all air activity. For Bikini events, two SA-16 aircraft were to be airborne, being

[redacted] [redacted]

stationed at strategic points in the array pattern and remaining airborne until the return of all aircraft from their missions. On dual shot operations, three SA-16 aircraft were to be airborne.

In addition to the SA-16 aircraft participation, a Search and Rescue H-19 was to be maintained on ground alert status. Two crash boats, one in the Eniwetok lagoon and one in the Bikini lagoon, were to be on full-time alert, continually monitoring Channel 4, the primary control communication channel, except during Bikini shots when the Bikini crash boat would be removed from the lagoon for protection.

Therefore, when the operational phase of REDWING got underway, the flight safety program and the attendant rescue capabilities of the task group were considered to be adequate.

Radiation Safety and Monitoring. The general concepts for radiation safety and monitoring for REDWING were discussed and outlined in July 1955 in a Joint Task Force SEVEN meeting at Sandia Base. One of the major areas considered was the problem of providing aircraft for post-shot aerial radiation safety surveys of the northern Marshall Islands. The conferees agreed that WB-50 aircraft would be utilized for this mission in addition to their regular missions of weather reconnaissance and cloud tracking.

In September 1955, the matter of radiological monitor training was explored. Two courses of action were examined, aimed at a single training program to fulfill the needs of airborne monitors,

[redacted]

Weather Island monitors, and monitors for Task Group 7.4 operational areas.

The first possibility examined was that of training personnel at established service schools in the Zone of Interior. This course of action was abandoned when the task group learned that all normal monitor training programs were scheduled for times when task group participation was impossible. Furthermore, insufficient time was available for arrangement at a Zone of Interior school of a special training program adapted to meet Task Group 7.4 requirements. Establishment of such a program would make necessary also a further expenditure of temporary duty funds.

The second course of action, establishment of a training capability within Task Group 7.4, finally was adopted. With this training capability, the Task Group could present a training program at the most advantageous point in the planning phase of REDWING, most likely in the proving ground after assembly of Task Group 7.4 elements. Several disadvantages, however, were acknowledged: the limited availability of trained instructors, the lack of visual aids and training instruments, and the dearth of space on Eniwetok for classroom activity.

After the decision of the group to conduct a training program, the Decontamination and Sampling Element was given the responsibility for preparing and conducting the course using its

[redacted]

own resources of equipment and personnel who were considered to be trained adequately, though not especially, for instructorship.

The course was presented in April 1956 in two phases. As expected, the course was hampered by the lack of suitable classroom space and of training aids; however, the lectures and radiac instrument training were adequate.

In April 1956, all personnel of the task group were issued permanent type film badges for measurement of personnel radiation dosage. Wearing of the badges was required throughout the operational period. The Test Aircraft Unit Commander was delegated the responsibility of establishing and manning personnel dosimetry facilities, of issuing film badges, pocket dosimeters, and radiac instruments, and of maintaining radiation dosimetric records.

Materiel Planning. The initial problem encountered in Materiel planning was the lack of qualified personnel. Although the Materiel personnel assigned originally to the group possessed proper Air Force Specialty Codes, in several cases the Commander found them incapable of performing required duties of a "crash" type operation. Because of these malassignments, personnel changes were made in the Materiel Directorate until very late in the planning phase of REDWING.

Early arrival of the Supply Staff Officer for duty with Task Group 7.4 enabled him to develop policies and procedures

[redacted]

which were ultimately instrumental in successful accomplishment of the Materiel mission. Among these procedures was the delineation of the extremely important Air Materiel Command supply support responsibilities. To carry out the coordination of Materiel activities, the Task Group Liaison Office was established with the 3103d Pacific Logistics Control Group at Oakland Army Base, California.

A Materiel conference was held in late August 1955, attended by representatives of all committed elements, to discuss and make firm the supply concept. Principal areas of consideration were the plans for field maintenance support and augmentation and the preliminary allocation of working space on Eniwetok.

During the months September through December 1955, supply and equipment requirements lists were submitted by the elements, reviewed by the Materiel Directorate, and forwarded to the Task Group Logistics Liaison Office for requisitioning and arrangement for shipment to the proving ground. Considerable difficulty was encountered in this program because of late submission by many elements of requirements lists and because of the late assignment of some elements to the task group.

A final Materiel conference was conducted in November 1955, during which the task group presented to element representatives the status of the Materiel program. Supply and equipment requirements, field maintenance requirements, working space allocation, and transportation requirements were made firm and final.

[redacted]

During the period November 1955 through May 1956, required supplies and equipment were procured and shipped to the proving ground. The first echelon of the Materiel Directorate, composed primarily of maintenance personnel, arrived in the proving ground in February 1956 and immediately began to organize and establish Materiel functions, such as the Maintenance Control Unit and supply activities. The advance echelon directed much attention also to the dissemination of supplies and equipment from stocks arriving in the proving ground. In several events, the break-out of supplies and equipment was hindered by late arrival and bulk shipment of stocks, a circumstance produced almost exclusively by the late submission by elements of their requirements lists.

The Materiel Directorate during the planning phase, was especially concerned also with the monitoring of the various modification programs. Although an aircraft modification status reporting system had been established in June 1955, the late assignment of some aircraft and late changes in modification resulted in a program which was not completed until early March 1956. The lack of modified aircraft seriously hampered training in many areas and made necessary the pursuit of accelerated and minimized training programs.

Other aspects of Materiel planning included the establishment of a Weather Island refueling facility, development of a crash emergency plan, allocation of vehicles to task group organizations,

[redacted]

formulation of an aircraft maintenance plan, and arrangement for surface transportation of short range aircraft.

In November 1955, the 4930th Support Group (Test) was delegated the responsibility of establishing and maintaining refueling facilities at Ponape, a weather island stop, for the provision of fuel and oil for SA-16 aircraft on supply missions to the weather station at Kapingamarangi. In February 1956, however, the Operations Directorate found that payload could be increased significantly by flying directly to Kapingamarangi, where refueling could be done. Therefore, the decision was made to position supplies in drums at Kapingamarangi, where the fuel could be dispensed by hand pump. A still later decision established the refueling facilities at Ponape as was originally planned and refueling was accomplished at Ponape throughout REDWING.

The crash emergency plan to remove immobilized aircraft from the Eniwetok runway in case of an accident was prepared in November 1955. The plan called for the assembly of a mobile crash kit consisting of slings, hoists, lifting bags, and flexible cable. An M-246 aircraft wrecker, already available at Eniwetok, was included in the plan. In accordance with the plan, a Maintenance Control Unit emergency team was constituted shortly after the arrival of the task group in the proving ground.

On 29 March, a B-57 settled to the runway with landing gear retracted during an attempted take-off, receiving major fuselage

[redacted]

damage. The emergency team participated in the removal operation. Inasmuch as the accident occurred during a period of relatively little air activity and since the removal could be performed without hurry, to prevent further damage to the aircraft, the team's capabilities were not fully tested. The aircraft was raised by jacks and towed away.

Two simulated emergencies and several stand-by alerts tested the capability of the team in April. The first test involved a WB-50 simulating an engine fire on the runway; several weaknesses of the emergency system were revealed, growing from a general lack of team coordination. A second test, involving an F-84 simulating a belly landing, was eminently successful, removal being completed in 30 minutes despite the use of caution to prevent damage to the aircraft. The F-84 removal, however, disclosed that certain necessary items had not been included in the crash kit and that inadequate planning had been done to provide for removal of radioactively contaminated aircraft. The necessary tools were added to the kit, and a system was incorporated in the emergency plan for removal of "hot" aircraft.

The task group schedule for allocation of general purpose vehicles was developed and was presented to element representatives in November 1955. Some 92 vehicles were contained on the list, and since some elements had been added to the group after compilation of the schedule, the allocation was found to be inadequate.

[redacted]

Subsequently, the allotment of vehicles was raised to 103 by Joint Task Force SEVEN, and a re-allocation was made which satisfied the minimum needs of Task Group 7.4.

An aircraft maintenance plan for Task Group 7.4 was completed and published by the Materiel Directorate in November 1955. The plan had as its purpose the provision of a guide for the support of aircraft maintenance by elements and for the coordinated use of base facilities to achieve the most logical and economical utilization of facilities and personnel. Among the provisions of the plan were the following: (a) A delineation of responsibilities of units performing organizational maintenance. (b) A listing of the responsibilities of the Base Maintenance Unit. (c) A summary of the duties of the Maintenance Control Unit. (d) A synopsis of general maintenance procedures and policies.

The problem of shipping short range aircraft to the proving ground was of major importance. No outstanding difficulty was encountered in arranging for transportation of smaller aircraft (one L-21, two L-20's, two F-84F's, and ten F-84G's); however, plans for shipment of the F-101 and the B-66 remained flexible until February 1956. The smaller aircraft were made available in February to Sacramento Air Materiel Area for cocooning and were loaded aboard the USS Badoeng Strait late in that month; they arrived at Eniwetok in March and were made operational soon thereafter.

[redacted]

After much delay, a decision was made in February to fly the B-66 to the proving ground utilizing an in-flight refueling plan formulated by Wright Air Development Center. The B-66 arrived at Eniwetok in late March, after a delay at Hickam Air Force Base, Hawaii, caused by a maintenance malfunction of the KB-29 which refueled the B-66 in flight.

The F-101 originally planned for REDWING participation was damaged extensively in January before being made ready for Task Group 7.4 use. A replacement F-101 was made available in March and late in the month was shipped to Eniwetok aboard the USS Curtiss.

Security Planning. Indoctrination and security testing of personnel was the initial step in creating the proper understanding of the REDWING operation and of individual responsibility toward security of the tests. Additional indoctrination lectures were presented at frequent intervals throughout the planning phase. Security was stressed by means of information letters, posters, and briefings culminating in the signing by individuals before departure to the proving ground of affidavits indicating the assumption of responsibility for maintaining security on all classified matters pertaining to the operation.

Other security planning activities included the development of a clearance program for all personnel going to the proving ground and having access to classified information; arrangement

[redacted]

for the security of REDWING aircraft staging through Hickam Air Force Base, Hawaii, enroute to Eniwetok; designation of entry requirements for personnel moving to the proving ground; setting up of controls for use and maintenance of photographic equipment in the proving ground; formulation of a program for assignment of resident agents of the Office of Special Investigation to the proving ground; and, development of a liaison system with other security agencies of Joint Task Force SEVEN and the Atomic Energy Commission.

Physical controls were established and administered at Eniwetok by the Test Base Unit. Besides the performance of normal air base security duties, the Air Police of the Test Base Unit maintained a Badge and Identification Section and were responsible for the security of the sample recovery area, the decontamination area, and activities of sample return aircraft arriving at Eniwetok, for the guarding of the drop aircraft and weapons during and after the loading process, and for the operational security of the photographic laboratory.

Before the departure of Task Group 7.4 to the proving ground, the Security Section compiled from all participating elements lists of names, together with rank and the status of security clearance, of all persons moving to the proving ground. These lists were provided to the Test Base Unit for the development of a control security file.

[redacted]

Funding Policies for REDWING. Funding policies of Task Group 7.4 were formulated in detail by the Special Weapons Center Budget Officer and the proposed task group Comptroller prior to the re-manning of the task group. After the group began planning operations, these funding policies were coordinated with, and approved by, Air Research and Development Command, Joint Task Force SEVEN, and Headquarters United States Air Force. The policies then were published by Air Force as a directive to Commands participating in REDWING. Funding, generally, was considered routine in all except a few areas, following the successful funding pattern used for Operation CASTLE, and was based upon provisions of the "McNeil Letter" (Mr. W. J. McNeil, Comptroller, Department of Defense, "Assumptions for Operating Expenses for Atomic Weapons Tests," dated 9 March 1953).

Funds for Task Group 7.4 operations during REDWING were to be derived from two major sources: Normal Service Operating Expenses were to be financed by participating Air Force Commands, in accordance with the "McNeil Letter"; Extra Expenses were to be financed by Joint Task Force SEVEN.

Normal Service Operating Expenses were to include the following: (a) Pay and allowances of personnel. (b) Costs of personnel subsistence. (c) Costs of travel and transportation of personnel to the first Task Force duty station upon initial assignment to Task Group 7.4 and from the last Task Force duty

[redacted]

station to the next regular duty assignment, including the costs of travel and transportation of the member, his family, and household goods, incidental to a permanent change of station when assigned to or released from assignment to the Task Force. (d) Medical and dental service costs for personnel. (e) Costs of aircraft and boats and other standard equipment and supplies necessary for the operation, including costs for maintenance, parts, petroleum, oil, lubricants, and consumable supplies required in support of Department of Defense participation. (f) Costs for packing, handling, and transportation of equipment and supplies furnished by the services for support of the Task Force.

Extra Expenses were to be financed from funds made available directly to the Task Force Commander, provided the facilities, equipment, and/or modifications were not to be continued in use by the service after completion of REDWING. These Extra Expenses were to include the following: (a) Costs of modification to, and subsequent restoration of, equipment and aircraft required by the operation. (b) Costs of activation and subsequent inactivation of aircraft and small surface craft. (c) Costs of construction and rehabilitation of structures at the test site required for the operation, in connection with approved Department of Defense test programs. (d) Costs of transportation of personnel attached to the Task Force and traveling under orders of the Task Force Commander, including costs of temporary duty travel as well as of

[redacted]

[redacted]

any permanent changes of station other than those covered by Normal Service Operating Expenses while assigned to the Task Force.

(e) Costs of materials or services required from activities operated under working capital funds.

After departure of the task group to the proving ground in February and March 1956, Comptroller activities were confined almost exclusively to the rear area (Kirtland Air Force Base), where the task group Comptroller worked in close coordination with the Special Weapons Center Comptroller. The Comptroller function was reduced to the monitoring of requirements for, and expenditures of, funds from both Air Force and Joint Task Force SEVEN sources. The Comptroller, Lieutenant Colonel Clarence M. Sartain, was appointed the Commander of the Task Group 7.4 Rear Echelon after the movement of the main body to Eniwetok.

A major task of the Comptroller during the planning phase was the arrangement for, and provision of, previously underestimated local purchase funds. Although an early agreement had been made that Air Materiel Command would provide these funds, that Command's resources were exhausted when the obligation of local purchase funds reached $166,000. The Special Weapons Center then assumed the obligation responsibility to meet requirements of the task group even though no Air Research and Development Command funds had been budgeted for this purpose. The Special Weapons Center provided some $189,000 for local purchase items during this

[redacted]

AFWL/HO

period; this action was instrumental in avoiding a stoppage in the retarded procurement program.

[redacted]

NOTES

1. Ltr., Col. H. E. Parsons, Director, Weapons Effects Tests, Hq. Fld. Comd., AFSWP to Comdr., AFSWC, 24 Mar. 55, subj.: Forecast of Test Requirements, in 4950th Test Gp. (N) hist. files.

2. Programming Plan 3-55, Hq. AFSWC, 9 May 55, subj.: Initial Planning for the Task Group 7.4 to Support REDWING, in 4950th Test Gp. (N) hist. files.

3. D/F, Col. H. D. Mahon, DCS/O, AFSWC to several staff sections, AFSWC, 22 Mar. 55, subj.: Planning Guidance for REDWING, in 4950th Test Gp. (N) hist. files.

4. Concept of Air Task Group Operations, Operation REDWING, Hq. Task Gp. 7.4, 30 June 55, in 4950th Test Gp. (N) hist. files.

5. Memo., subj.: Operational Planning Conference for Operation REDWING, 8 Sep. 55, in 4950th Test Gp. (N) hist. files.

6. Ltr., Dr. Alvin C. Graves, Los Alamos Scientific Laboratory, to Brig. Gen. W. M. Canterbury, Hq. AFSWC, 24 Feb. 55, no subj., in 4950th Test Gp. (N) hist. files.

7. TWX, AFSWC-SWR-5-5, Comdr. AFSWC to Comdr. ARDC, 5 May 55, in 4950th Test Gp. (N) hist. files.

8. Ltr., Comdr. Task Gp. 7.4 to Comdr. 4925th Test Gp. (A), 25 Jul. 55, subj.: Air Drop Requirements for REDWING, in 4950th Test Gp. (N) hist. files.

[redacted]

## CHAPTER II

## OPERATIONAL PHASE OF OPERATION REDWING

### Mission and Organizational Structure of Task Group 7.4 Units

The organizational structure and strength of the task group were based upon the character and magnitude of its assigned missions. Essentially, this structural concept was patterned on that of Operation CASTLE.

The task group was functionally organized into three subordinate units in addition to the headquarters. The units were manned by personnel from six major Air Commands. Upon publication of the Air Force "Book Message" in September 1955, a document which constituted the task group charter and designated the participating organizations, the task group was granted authority to exercise operational control of all Air Force units and detachments manned to participate in planning and coordination before movement of the group to the proving ground. After their arrival in the proving ground, beginning in January 1956, units and elements came under the operational control of the task group for the duration of the test series.

Headquarters Task Group 7.4 began movement to Eniwetok on 25 January 1956, when the first increment of the advance echelon departed from Kirtland Air Force Base. The last of the main body arrived

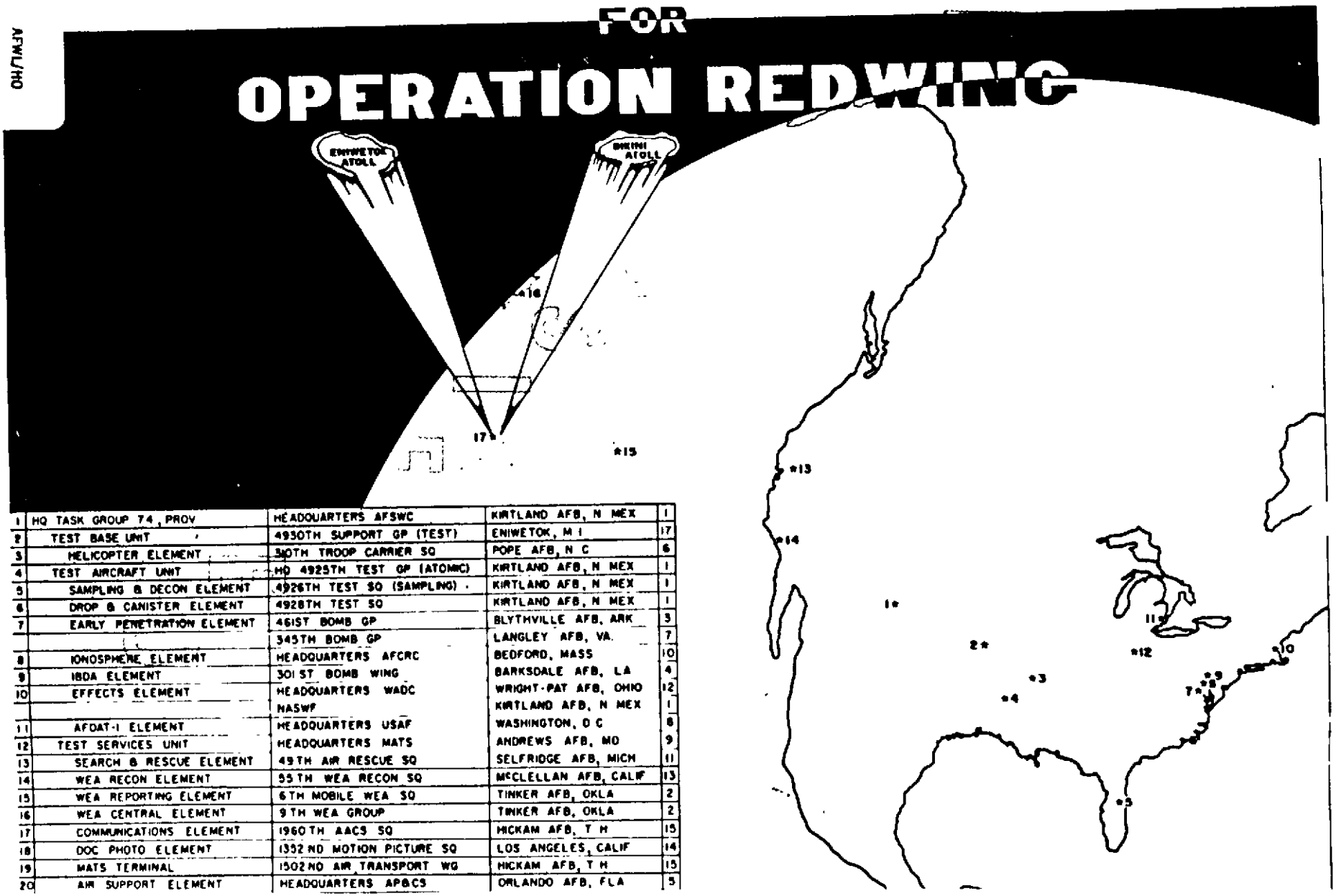
[redacted]

# AIR FORCE PARTICIPATING ORGANIZATIONS

## FOR

# OPERATION REDWING

AFWL/HO




| | | | | |
|---|---|---|---|---|
| 1 | HQ TASK GROUP 7.4, PROV | HEADQUARTERS AFSWC | KIRTLAND AFB, N MEX | 1 |
| 2 | TEST BASE UNIT | 4930TH SUPPORT GP (TEST) | ENIWETOK, M I | 17 |
| 3 | HELICOPTER ELEMENT | 30TH TROOP CARRIER SQ | POPE AFB, N C | 6 |
| 4 | TEST AIRCRAFT UNIT | HQ 4925TH TEST GP (ATOMIC) | KIRTLAND AFB, N MEX | 1 |
| 5 | SAMPLING & DECON ELEMENT | 4926TH TEST SQ (SAMPLING) | KIRTLAND AFB, N MEX | 1 |
| 6 | DROP & CANISTER ELEMENT | 4928TH TEST SQ | KIRTLAND AFB, N MEX | 1 |
| 7 | EARLY PENETRATION ELEMENT | 461ST BOMB GP | BLYTHVILLE AFB, ARK | 3 |
| | | 345TH BOMB GP | LANGLEY AFB, VA. | 7 |
| 8 | IONOSPHERE ELEMENT | HEADQUARTERS AFCRC | BEDFORD, MASS | 10 |
| 9 | IBDA ELEMENT | 301ST BOMB WING | BARKSDALE AFB, LA | 4 |
| 10 | EFFECTS ELEMENT | HEADQUARTERS WADC | WRIGHT-PAT AFB, OHIO | 12 |
| | | NASWF | KIRTLAND AFB, N MEX | 1 |
| 11 | AFOAT-1 ELEMENT | HEADQUARTERS USAF | WASHINGTON, D C | 8 |
| 12 | TEST SERVICES UNIT | HEADQUARTERS MATS | ANDREWS AFB, MD | 9 |
| 13 | SEARCH & RESCUE ELEMENT | 49TH AIR RESCUE SQ | SELFRIDGE AFB, MICH | 11 |
| 14 | WEA RECON ELEMENT | 55TH WEA RECON SQ | McCLELLAN AFB, CALIF | 13 |
| 15 | WEA REPORTING ELEMENT | 6TH MOBILE WEA SQ | TINKER AFB, OKLA | 2 |
| 16 | WEA CENTRAL ELEMENT | 9TH WEA GROUP | TINKER AFB, OKLA | 2 |
| 17 | COMMUNICATIONS ELEMENT | 1960TH AACS SQ | HICKAM AFB, T H | 15 |
| 18 | DOC PHOTO ELEMENT | 1352ND MOTION PICTURE SQ | LOS ANGELES, CALIF | 14 |
| 19 | MATS TERMINAL | 1502ND AIR TRANSPORT WG | HICKAM AFB, T H | 15 |
| 20 | AIR SUPPORT ELEMENT | HEADQUARTERS AP&CS | ORLANDO AFB, FLA | 5 |

86

at Eniwetok on 16 March. The advance echelon was under the command of Colonel Paul R. Wignall, Deputy Commander, who relinquished his command to Colonel Samuel when the latter arrived at Eniwetok on 20 March. The rear echelon, which remained at Kirtland throughout the operational period, was under the command of Lieutenant Colonel Clarence M. Sartain, Task Group 7.4 Comptroller.

As the transition was begun from the planning phase to the operational phase, most of the principal planning projects had reached, or nearly reached, completion. For example, the Air Operations Center, an especially important planning item, after many delays in construction of the control room and in installation of equipment, began limited operations. The effective installation of runway barriers, having been retarded by the lack of certain barrier components, was completed on the airstrips on NAN, PETER-OBOE, and JANET by the end of April; however, functional difficulty delayed the full operation of the Eniwetok barrier until late in June. The problem of acquisition and transportation of supplies and equipment, long a major source of concern, had been reduced, although some backlogs continued to accumulate, none of which seriously impeded normal operations.

Test Aircraft Unit. The Test Aircraft Unit, comprised of eight elements, exercised operational control over all test aircraft and was responsible for briefing of all aircrews involved

[redacted]

in test projects. Command of the Test Aircraft Unit was assumed, as in CASTLE, by the Commander of the 4926th Test Squadron (Sampling) of the Special Weapons Center, who for REDWING was Colonel Carl A. Ousley.

The eight elements, their composition, and their missions are described in the succeeding paragraphs.

The Sampling and Decontamination Element, manned by the 4926th Test Squadron (Sampling), conducted nuclear cloud sampling operations with ten F-84G and six B-57B aircraft.

Sampling requirements for REDWING, as outlined by Air Force and by Los Alamos Scientific Laboratory and University of California Research Laboratory, called for a minimum of five samples per shot, collected at altitudes up to 55,000 feet. A sample consisted of a predetermined amount of radioactive material, generated from the detonation of a nuclear device, collected on a special filter paper or in gas bottles. After return of each aircraft from the sampling mission, the filter papers and gas bottles were removed from the aircraft and processed for immediate shipment to Atomic Energy Commission laboratories in the Zone of Interior for radiochemical analysis.

The Sampling and Decontamination Element also functioned as an administrative group headquarters for the Test Aircraft Unit.

[redacted]

The Indirect Bomb Damage Assessment Element, a detachment of the 301st Bombardment Wing (Strategic Air Command), Barksdale Air Force Base, Louisiana, evaluated current operational procedures, techniques, and equipment used in accomplishing the data phase of indirect bomb damage assessment of nuclear weapons. To accomplish this mission, three B-47 aircraft, three combat crews, and thirty-six support personnel participated in REDWING. Each aircraft was equipped with cameras to photograph bomb burst and fireball, with instruments to determine yield, and with equipment to determine precise aircraft speed and range.

The Wright Air Development Center Weapons Effects Element used seven aircraft in pursuing its mission; a B-47E, an RB-52B, a B-66B, a B-57B, an F-101A, and two F-84F's. One of the two F-84F aircraft was a capabilities aircraft; the other was a side loads effects aircraft.

This element had three objectives during REDWING. First and most important was to determine by test what types of weapons United States aircraft were capable of delivering, from what altitudes, for what burst heights, and the possibilities of escape without damage from blast, gust, thermal, and nuclear radiation effects.

The second objective was the development of new design criteria for future aircraft. By positioning of aircraft at various altitudes and at various ranges with respect to the center

[redacted]

of explosion and by recording measurements of blast overpressures, gust loads, and temperatures, engineers gathered information to ascertain weaknesses and critical components of the aircraft.

The third objective was to improve the methods and techniques of analytically predicting the input to aircraft and crews from blast, gust, caloric field, and nuclear radiation of weapons.

The Early Penetration Element utilized pilots and B-57B aircraft assigned to the 345th Bombardment Group and the 405th Bombardment Group, Langley Air Force Base, Virginia, and to the 461st Bombardment Group, Blytheville Air Force Base, Arkansas. These groups were organizations of the Tactical Air Command. Flight crews from the two groups ferried the aircraft to Eniwetok, remained to make one nuclear cloud penetration, then were returned to their home stations by Military Air Transport Service, to be replaced by other crews from the same groups. The rotation program continued throughout the test series.

This element had the responsibility of collecting flight information for Project 2.66 under guidance of Task Group 7.1. Project 2.66 was concerned with the securing of information by early penetration of nuclear clouds at high altitudes.

Because early cloud penetrations in manned aircraft was a relatively new field of research, penetration times in the first shots were planned to provide a considerable margin of safety

[redacted]

AFWL/HL

from turbulence and radiation. As the tests progressed, the penetration times were systematically moved closer to time zero, until final penetrations were made within minutes of H-hour.

The Navy Effects Element used an A3D and a P2V aircraft furnished by the Naval Air Special Weapons Facility, Kirtland Air Force Base. This element was concerned basically with the determination of response of aircraft structures to effects of thermonuclear explosions.

The Ionospheric Element, a detachment from the Air Force Cambridge Research Center, consisted of 21 personnel and a specially instrumented JC-97 aircraft. The complement included four project scientific personnel under the direction and supervision of Dr. George J. Gassman, physicist, assigned to the Geophysical Research Directorate of the Cambridge Center. The aircraft was equipped with the only known airborne Ionospheric Recorder in existence.

The mission of the element primarily was to conduct research on and study the effects of nuclear detonations on the ionosphere. Flight patterns were designed to probe and determine limits, character, and magnitude of ionospheric changes resulting from nuclear detonations.

[redacted]

A secondary mission of the Ionospheric Element was to provide an airborne test-bed from which a second project, "Ultrasonics," could operate its equipment. The goal of "Ultrasonics" was to determine the maximum range at which pulse signals, generated by detonations, could be detected, read, and measured.

Gathering data for universal use and common ionospheric study and research was a tertiary mission of the element. These data were secured between shots during seven ionospheric "tide" measurement missions. These measurements were made in a general area encompassed by Eniwetok Atoll, Tarawa Atoll, Taongi Atoll, and a point approximately 850 nautical miles north-northeast of Wake Island, an area of some 20,000 square miles.

The Drop and Canister Element, provided by the 4928th Test Squadron, 4925th Test Group (Atomic), Kirtland Air Force Base, consisted of two B-52 and one B-36 aircraft. The B-52's were concerned with the drop of the CHEROKEE device, one B-52 being kept ready for use as a back-up aircraft. The B-36, after dropping the canisters during the CHEROKEE test, was used for the drop of the OSAGE weapon.

The eighth element of the Test Aircraft Unit was the AFOAT-1 (Office of the Assistant for Atomic Energy, detachment) Element, manned, trained, and equipped by the Office of the Assistant for Atomic Energy, utilizing aircraft of the Sampling and Decontamination Element.

[redacted]

Test Base Unit. The 4930th Support Group (Test) manned by, and under supervision of, the Special Weapons Center was charged with the responsibility of providing and maintaining air base facilities at Eniwetok and Bikini on a permanent basis. Upon arrival of the task group in the proving ground the 4930th became the Test Base Unit, the operational control of which passed to the Commander, Task Group 7.4. Lieutenant Colonel (later Colonel) William A. Hunter originally commanded the unit and was succeeded late in the operation by Lieutenant Colonel Laverne F. Huston. Additional missions of support included the operation of inter-island and inter-atoll airlift, operation of the facilities for petroleum, oil, and lubricants and of fire fighting facilities, operation of an aircraft field maintenance system augmented by personnel of other units, and for provision of administrative and proficiency flying for all rated personnel of the Joint Task Force. To provide these supporting services, no major reorganization of the 4930th was necessary.

The Test Base Unit was composed of the 4930th Support Group, which served as a headquarters for the unit providing such functions as security, personnel services, and administrative assistance to the task group headquarters, the 4931st Operations Squadron, the 4932nd Materiel Squadron, and the H-19 Lift Element.

[redacted] [redacted]

The 4931st Operations Squadron, manned by the Special Weapons Center, operated the airlift aircraft assigned to the 4932nd Materiel Squadron, operated air base facilities at both Eniwetok and Bikini, maintained structural and crash fire protection at Eniwetok and crash fire protection at Bikini, operated the crash boats at both Eniwetok and Bikini, arranged for billeting for all Air Force personnel at Eniwetok, and provided a pro rata share of personnel for the food services.

The 4932nd, although maintaining four C-47's, eight L-20's, and one L-21 operated by the 4931st for inter-island and inter-atoll airlift, was charged primarily with the responsibility for Base Supply and field maintenance activities.

The H-19 Lift Element from the 310th Troop Carrier Squadron of Pope Air Force Base, North Carolina, operated 10 H-19B aircraft in cargo and personnel airlift activities to sites where no landing strips were available. The H-19B's were used at Bikini for airlift at that atoll until late January 1956, when the aircraft were returned to similar duties at Eniwetok, being replaced by a Marine Helicopter Squadron. Late in March, because of grounding of the Marine aircraft, the Air Force H-19's were again put into operation at Bikini, remaining on duty there until 28 April, when they were removed to Eniwetok.

Test Services Unit. The Test Services Unit, excepting the Technical Photography Element and two SA-16 aircraft of the

[redacted]

ENIWETOK OPERATIONS

(Fred Airstrip)

1. Takeoffs and landings:

| | |
|---|---|
| March | 6472 |
| April | 5145 |
| May | 5523 |
| June | 4045 |
| July 1-15 | 1876 |
| Total | 23061 |

2. Number of flights:

| MONTH | TBU | TAU | TSU | MISC (MATS, etc.) | TOTAL |
|---|---|---|---|---|---|
| March | 432 | 100 | 142 | 140 | 864 |
| April | 452 | 210 | 228 | 165 | 1055 |
| May | 639 | 349 | 344 | 257 | 1589 |
| June | 508 | 262 | 315 | 212 | 1297 |
| July 1-15 | 216 | 109 | 134 | 116 | 575 |
| | 2297 | 1030 | 1163 | 890 | 5380 |

3. Total flying hours 7.4:

| | |
|---|---|
| March | 2204 |
| April | 3075 |
| May | 3878 |
| June | 3680 |
| July 1-15 | 1633 |
| Total | 14470 |

AFWL/HO

Search and Rescue Element, was a contribution of the Military Air Transport Service. The unit had several assigned missions consisting basically of providing technical support service. Military Air Transport Service was responsible for the organization, manning, training, and deployment of eight of the nine Test Services Unit elements, the only exception being the Technical Photography Element which was furnished by the Far East Air Force.

The Test Services Unit, commanded by Colonel William S. Barney, was the largest unit of Task Group 7.4, having at the peak of the operation approximately 1,000 officers, airmen, and civilians from the Air Force, the Army, and the Navy, serving at ten separate island locations. The unit had 23 aircraft assigned; ten WB-50's, three C-54's, and five SA-16's were provided by Military Air Transport Service; three RB-50's and two SA-16's were provided by Far East Air Force. The nine elements comprising the Test Services Unit are described in the following paragraphs.

The Weather Reconnaissance Element, operating ten WB-50 aircraft, was committed to fly two weather tracks each day, a commitment which was increased to three tracks daily immediately prior to, during, and subsequent to shot days. In addition to their use in collection of weather data, the element's aircraft were used for typhoon reconnaissance, post-shot cloud tracking, and related activities. All of the WB-50's were prepared to function as back-up sampler control aircraft.

[redacted]

The Weather Reporting Element manned weather reporting stations, including the permanent station at Eniwetok and four located on the remote islands of Rongerik, Tarawa, Kusaie, and Kapingamarangi. The weather reporting stations collected surface and upper air meteorological data with rawinsonde equipment. Normally, four rawinsonde observations were made daily at each of the weather stations; but, during maximum activity periods immediately prior to shot days, observations were increased to eight and occasionally to twelve per day.

The Weather Reconnaissance Element and the Weather Reporting Element supplied the results of their observations to a third Test Services Unit element, the Weather Central Element, which was responsible for weather forecasting, under the direct operational control of the Joint Task Force SEVEN Commander. Because of the vital importance of accurate and timely weather data for Command decisions, the Weather Central was located on Parry Island in Joint Task Force SEVEN Headquarters. Weather Central received data from all United States agencies in Pacific areas, the United States Weather Service, the Navy, and other Air Force Weather organizations, and from various collection agencies of other nations, using such information media as the Fiji and Canberra radio broadcasts. Facsimile transmissions and data collectives were received from other Weather Central agencies at Tokyo and Pearl Harbor.

[redacted]

The fourth Test Services Unit subordinate organization was the Documentary Photography Element (Air Support), which utilized three C-54's for the three-part mission of providing a photographic platform for camera crews, of providing supplemental airlift, and of providing a very high frequency communications relay. The primary mission was concerned with the documentary photography effort, the provision of a platform for camera crews over and adjacent to shot zones during all tests and for other air-to-air and ground-to-ground photography as required. The supplementary airlift mission was of almost equal importance, its objective being the re-supply of radiological and weather units on Tarawa, Wake, Majuro, and Truk, the general re-supply and transportation of personnel to and from Bikini, the performance of priority logistic flights to Hickam, and the support of Indirect Bomb Damage Assessment Element maintenance activities at Guam. The third mission, compatible with the documentary photography flying mission, was the provision of airborne very high frequency communications relay between Eniwetok and Bikini on shot and rehearsal days. This requirement, however, was removed in late June 1956.

The Documentary Photography Element (Technical) provided photographic equipment and technical personnel for accomplishing the documentary photography mission for REDWING. The element was charged with the responsibility of producing the Joint Task Force

[redacted]

SEVEN Commander's Report film; but, many other film projects were assigned and accomplished. This element participated in every test detonation, the camera crews (both still and motion picture) operating from the C-54 aircraft, from various surface vessels, and from fixed land positions. Back-up for photographic coverage to civilian newsmen for the CHEROKEE shot was provided by this element; this back-up photography ultimately was used extensively for news media when the civilian coverage proved unsatisfactory because of cloud cover between the USS Mount McKinley (where the civilians were positioned) and the blast. Historical record film, public release footage, and technical films were produced by this element.

The sixth Test Services Unit element was the Technical Photography Element, which, utilizing three RB-50 aircraft, was responsible for obtaining technical photographs of bomb craters, atomic bursts, and atomic cloud growth for the Armed Forces Special Weapons Project. This element did not participate in all shots, since from the viewpoint of their coverage, several tests were similar in photographic nature. Besides test photography, aerial photography of many Pacific islands and atolls used in the 1956 test series was performed by this element in the early parts of the operation.

The Technical Photography Element, furnished from the Far East Air Force, was placed under control of the Test Services

[redacted]

Unit because of its aircraft maintenance compatibility with that of the Weather Reconnaissance Element.

Prior to Operation REDWING, the Communications Element was known as the 1253rd Airways and Air Communications Service Squadron and was a permanent organization at Eniwetok. The squadron became the Communications Element upon designation of the Test Services Unit and was responsible for the operation of the communications-electronic and Air Traffic Control facilities in support of REDWING. These facilities included navigational aids, ground communications, Weather Central communications, and Weather Island and special facilities.

Eniwetok was a tributary relay station in the Global Communications System. This multiplex service was a counterpart of the United States Army Signal Corps and was a joint endeavor, with both the Air Force and Army furnishing personnel to operate the Joint Tape Relay Center, the Joint High Frequency Transmitter Site, and the Joint High Frequency Receiver Site.

The Communications Element operated the Task Group 7.4 communications Center which consisted of a full duplex to the Joint Tape Relay Center, half duplex straight patch to Kwajalein Major Relay Center, half duplex to Parry Weather Central, full duplex to Task Group 7.5 Communications Center, and a full duplex to the USS Estes.

[redacted]

Communications for the Weather Island facilities operated by the Communications Element consisted of high frequency point-to-point, low frequency homer, and ultra high frequency air/ground communications at Kapingamarangi, Rongerik, and Kusaie, and high frequency point-to-point and ultra high frequency air/ground communications at Tarawa.

The Communications Element also provided several additional facilities. These facilities included the high frequency point-to-point voice and control/warning net with Bikini Control Tower, Kwajalein Air Route Traffic Control, Wake Island Civil Aeronautics Authority, and Eniwetok Approach Control. The primary purpose of this net was to pass Air Traffic Control messages between the four enumerated agencies. Another special type facility operated by the Communications Element was the Parry Island Dispatch, an ultra high frequency air/ground facility used to control the flights of helicopter and liaison type aircraft around Eniwetok Atoll.

The Military Air Transport Service Terminal Element was the eighth Test Service Unit organization. Prior to Operation REDWING, the Terminal Element was a detachment of the 1502nd Air Terminal Squadron, Hickam Air Force Base,

The Terminal Element was responsible for the efficient movement and mainfesting of passengers, cargo, and mail to and from Eniwetok; for the loading of test samples and the receipt

[redacted]

and unloading of atomic weapons and devices; for the maintenance of all Military Air Transport Service aircraft; and for customs activities and dispatch of Military Air Transport Service aircraft.

The expeditious handling and dispatching of test samples was especially instrumental to the success of REDWING. During the operation, 27 sample return aircraft were maintained, loaded, and dispatched without ground or air abort or without other delay. Customs clearance at Eniwetok reduced aircraft ground time at Hickam appreciably and contributed significantly to the rapid delivery of test samples to Zone of Interior laboratories.

The Joint Task Force SEVEN search and rescue capability was the responsibility basically of the Test Services Unit's ninth element, the Search and Rescue Element. The element utilized seven SA-16 aircraft and crews from three separate Air Force organizations, the 49th Air Rescue Squadron of Selfridge Air Force Base, Michigan, the 76th Air Rescue Squadron of Hickam Air Force Base, Hawaii, and the 581st Air Resupply Group of Kadena Air Force Base, Okinawa.

Besides the search and rescue capability, re-supply support of Project and Weather Islands was a prime function of the element. The re-supply support mission actually required more time and effort than did the search and rescue mission. Back-up support, both for rescue and for re-supply activities was provided to the task group

[redacted]

by the Kwajalein Naval Air Station, this support being used in only one search mission.

The element's aircraft participated in every shot rehearsal and actual shot day mission, always with one SA-16 on orbit and frequently with two or more aircraft in the air. Intercepts of disabled aircraft also were a major activity of the resuce aircraft; numerous aircraft with engine failure or other difficulty were intercepted and escorted to safe landings.

The major search mission in which the element was engaged during REDWING occurred on 18 May 1956, when the pilot and observer of a B-57 bailed out some 50 miles east of Eniwetok. The only survivor, the pilot, was sighted by an SA-16 crew which directed a surface vessel to the scene to complete the rescue. The element flew 30 sorties for a total of 163 flying hours in the subsequent unsuccessful search for the observer, a mission which continued through 22 May 1956. The Kwajalein Naval Air Station back-up support was used in this incident.

Aircraft of the element, because of their water landing capability, were used extensively in re-supply functions to such outlying islands as Kapingamarangi, Kusaie, Ujelang, Ponape, Rongerik, Utirik, Wotho, and Ailinginae. In pursuit of these duties, the element's SA-16's flew some 919 hours.

[redacted]

Personnel Strength and Morale

At the end of March 1956, some six weeks before the beginning of the operational phase of REDWING, 1,989 Task Group 7.4 personnel were in the proving ground, including 82 civilians. The aggregate strength of Task group 7.4 continued to increase until it reached a peak of 2,179 on 17 May. A gradual decline continued through the remainder of May and during June; then, in July, as the end of the operational period approached, the strength decline was accelerated until on 22 July it stood at 1,660.

Personnel overages in the Test Base Unit was an area of discussion in March 1956, just prior to the initiation of the operational phase. The unit, in comparing its actual strength with the Unit Manning Document authorization, was some 45 airmen over strength. A list of surpluses was submitted to the Special Weapons Center for immediate reassignment of these personnel to the Zone of Interior, a move aimed at alleviating crowded housing and messing facilities at Eniwetok. The airman strength of the Test Base Unit, however, showed no significant decrease through June, after having reached 667 at the end of April.

Virtually all elements indicated that their personnel, with few exceptions, were well qualified to perform REDWING duties, especially airmen in the five and seven levels of the Air Force Specialty Code. The Test Aircraft Unit experienced some difficulty with newly assigned three level personnel who were sometimes lacking

[redacted]

in primary military training. This difficulty was eased considerably after the test series began, as a result of close direct supervision of, and personal attention to, these airmen.

Although the prospect of low morale had been anticipated, because of the inevitable crowded and temporary living conditions in the remote proving ground, only one outstanding unfavorable circumstance was noticed. By directive from Joint Task Force SEVEN, Task Group 7.2 at the beginning of planning for REDWING was made responsible for the provision and maintenance of messing facilities for all personnel, including Task Group 7.4 personnel, residing on Eniwetok Island. After arrival of Task Group 7.4 personnel, the fact became apparent that food service was inadequate. For example, sanitary conditions became marginal, food stocks were frequently exhausted, and food was often poorly prepared. Colonel Samuel directed his staff to maintain continuous liaison with the Task Group 7.2 Commander in an effort to improve the quality of food service.

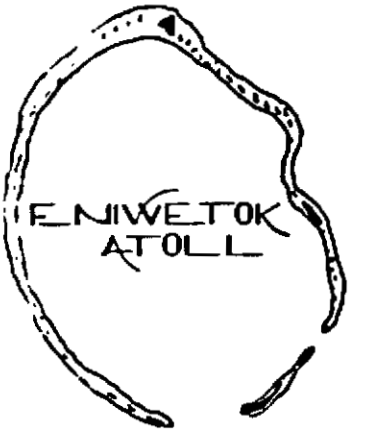
The Troop Commandant of Task Group 7.4, Major Connie J. Laino, was appointed shortly after arrival at Eniwetok of the task group main body, to monitor the mess facilities, to eat periodically in the airmen's messhall, and to advise Colonel Samuel of unsatisfactory conditions. An even more stringent survey was maintained after several officers suffered food poisoning in

[redacted]

# CALENDAR OF EVENTS

## 1956 OPERATION REDWING — MAY

| SUN | MON | TUE | WED | THUR | FRI | SAT |
|---|---|---|---|---|---|---|
| | | 1 (L-1) | 2 (L-2) | 3 (L-1)** | 4 (L-1)(C-2) | LACROSSE (C-2)* |
| 6 (C-2)* | 7 (C-2) | 8 (C-2)* | 9 (C-2) | 10 (C-1) | 11 (C-2)** | 12 (C-2) |
| 13 (C-2) | 14 (C-2) | 15 (C-2)* | 16 (C-1) | 17 (C-1) | 18 (C-2)** | 19 (C-2) |
| 20 (C-1) | CHEROKEE | 22 | 23 | 24 | 25 | 26 (Y-2)(Z-2) |
| 27 (Y-1)(Z-1) | YUMA ZUNI | 29 (E-2) | 30 (E-1) | ERIE | | |

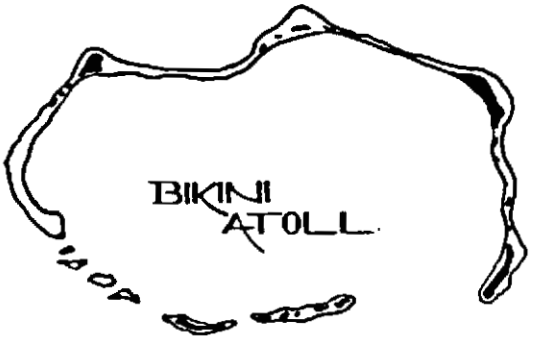



## JUNE

| SUN | MON | TUE | WED | THUR | FRI | SAT |
|---|---|---|---|---|---|---|
| | | | | | 1 | 2 |
| 3 | 4 (S-2) | 5 (S-1) | SEMINOLE | 7 | 8 | 9 (F-2) |
| 10 (F-2)(B-2) | 11 (F-1)(B-1) | FLATHEAD BLACKFOOT | 13 (K-1) | KICKAPOO (O-2) | 15 (O-1) | OSAGE (O-2)* |
| 17 (D-1) | 18 (D-1) | 19 (D-2)* | 20 (D-2)(I-2) | 21 (D-1)(I-1) | INCA *(D-2)** | 23 (D-2)* |
| 24 (D-2)* | 25 (D-1) | DAKOTA | 27 | 28 | 29 | 30 (H-2) |

## JULY

| SUN | MON | TUE | WED | THUR | FRI | SAT |
|---|---|---|---|---|---|---|
| 1 (H-1)(M-2) | 2 (H-2)(M-1) | MOHAWK (H-2) | 4 (H-2) | 5 | 6 (A-2) | 7 (A-1)(N-2) |
| 8 (A-1)(N-1) | APACHE (N-1) | 10 (N-1) | NAVAJO | 12 | 13 | 14 |
| 15 | 16 (T-2) | 17 (T-2)* | 18 (T-2)(H-2) | 19 (T-2)(H-1) | 20 (T-1)(H-2) | TEWA (H-1) |
| HURON | 23 | 24 | 25 | 26 | 27 | 28 |
| 29 | 30 | 31 | | | | |




* UNOFFICIAL D-1 CHANGED TO D-2 PRIOR TO MINUS 18 HOUR ADVISORY.

** SHOT CANCELLED AFTER AIRCRAFT HAD TAKEN OFF.

AFWL/HO

April. Thereafter, some improvement was noted but the service was still not up to desired standards.

A conference was held in June with Task Group 7.2 to determine a course for provision of better food service. Aspects of the discussion included methods of dispensing food and of maintaining the messhall, supervision of food handlers and kitchen detail personnel, and cooking methods especially of fowl and pork.

Soon after the conference, an over-all improvement was noticeable in sanitation and messing conditions. However, this improvement was not great enough to cause a general increase of morale; nor was the improvement sustained. The messing problem remained troublesome until the end of the test operation.

## Shots and Aircraft Participation

Throughout the seven rehearsals, the seventeen shots, and six aborted shots, the aircraft scheduling, mission execution, and aircraft recovery proceeded with only two major difficulties, the loss of a B-57 during a cancelled mission on 18 May and the bombing error on CHEROKEE. For these missions which culminated in an actual shot, 94 per cent of all aircraft scheduled to participate made good their missions; of the aborts, failure of Raydist and MSQ-1A ground positioning equipment accounted for 38 per cent. For those shots which were cancelled because of unfavorable weather or for

[redacted]

# AIRCRAFT PARTICIPATION

| | WADC B-47 | | | | WADC B-52 | | | | WADC B-66 | | | | WADC B-57 | | | | SIDE LOAD F-84F | | | | CAPABILITY F-84F | | | | WADC F-101 | | | | 1BBA B-47 | | | | TOTAL EFFORT | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | OPS ORD | SCHED | COMP | PCT COMP | OPS ORD | SCHED | COMP | PCT COMP | OPS ORD | SCHED | COMP | PCT COMP | OPS ORD | SCHED | COMP | PCT COMP | OPS ORD | SCHED | COMP | PCT COMP | OPS ORD | SCHED | COMP | PCT COMP | OPS ORD | SCHED | COMP | PCT COMP | OPS ORD | SCHED | COMP | PCT COMP | OPS ORD | SCHED | COMP | PCT COMP |
| LACROSSE | | | | | | | | | | 1 | 0 | 0 | 1 | 1 | 1 | 100 | 1 | 1 | 1 | 100 | 1 | 1 | 1 | 100 | 1 | 1 | 1 | 100 | | | | | 18 | 19 | 18 | 95 |
| CHEROKEE | 1 | 1 | 1 | 100 | 1 | 1 | 1 | 100 | 1 | 1 | 1 | 100 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 2 | 2 | 100 | 29 | 33 | 26 | 79 |
| ZUNI | 1 | 1 | 1 | 100 | 1 | 1 | 1 | 100 | 1 | 1 | 1 | 100 | | | | | 1 | 1 | 1 | 100 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 2 | 3 | 3 | 100 | 27 | 27 | 25 | 93 |
| YUMA | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | 3 | 3 | 100 | 11 | 12 | 13 | 100 |
| ERIE | | | | | | | | | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 100 | 1 | 1 | 1 | 100 | | | | | 1 | 1 | 1 | 100 | | | | | 14 | 15 | 14 | 93 |
| SEMINOLE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 10 | 10 | 11 | 110 |
| FLATHEAD | 1 | 1 | 1 | 100 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 100 | 1 | 1 | 1 | 100 | 1 | 1 | 1 | 100 | 1 | 1 | 1 | 100 | 1 | 1 | 1 | 100 | 3 | 3 | 1 | 33 | 33 | 26 | 23 | 88 |
| BLACKFOOT | | | | | | | | | 1 ON FLATHEAD | | | | 1 ON FLATHEAD | | | | | | | | | | | | 1 ON FLATHEAD | | | | | | | | 12 | 9 | 9 | 100 |
| EICKAPOO | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1 | 1 | 100 | | | | | 10 | 10 | 10 | 100 |
| OSAGE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 9 | 9 | 9 | 100 |
| DAKOTA | 1 | 1 | 1 | 100 | 1 | 1 | 1 | 100 | 1 | 1 | 1 | 100 | 1 | 1 | 1 | 100 | 1 | 1 | 1 | 100 | 1 | 1 | 1 | 100 | 1 | 1 | 1 | 100 | 3 | 3 | 3 | 100 | 29 | 29 | 29 | 100 |
| INCA | | | | | | | | | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 100 | | | | | | | | | 1 | 1 | 1 | 100 | | | | | 13 | 13 | 12 | 92 |
| MOHAWK | 1 | 1 | 1 | 100 | 1 | 1 | 1 | 100 | 1 | 1 | 1 | 100 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 100 | 1 | 1 | 1 | 100 | 1 | 1 | 1 | 100 | 3 | 3 | 3 | 100 | 26 | 26 | 23 | 88 |
| APACHE | 1 | 1 | 1 | 100 | 1 | 1 | 1 | 100 | 1 | 1 | 1 | 100 | 1 | 1 | 1 | 100 | 1 | 1 | 1 | 100 | 1 | 1 | 1 | 100 | 1 | 1 | 1 | 100 | 2 | 2 | 2 | 100 | 28 | 30 | 30 | 100 |
| NAVAJO | 1 | 1 | 1 | 100 | 1 | 1 | 1 | 100 | 1 | 1 | 1 | 100 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 100 | 1 | 1 | 1 | 100 | 1 | 1 | 1 | 100 | 2 | 2 | 2 | 100 | 26 | 30 | 29 | 97 |
| TEWA | | 1 | 1 | 100 | | 1 | 1 | 100 | | 1 | 1 | 100 | | 0 | | | | 0 | | | | 0 | | | | 0 | | | RETURNED ZI | | | | | 19 | 18 | 95 |
| HURON | 1 | 1 | 1 | 100 | 1 | 1 | 1 | 100 | 1 | 1 | 1 | 100 | 1 | 1 | 1 | 100 | 1 | 1 | 1 | 100 | 1 | 0 | | | 1 | 0 | | | 2 | 0 | | | 28 | 17 | 17 | 100 |
| TOTAL | 8 | 9 | 9 | 100 | 8 | 9 | 8 | 89 | 11 | 12 | 9 | 75 | 11 | 10 | 7 | 70 | 10 | 10 | 9 | 90 | 9 | 8 | 6 | 75 | 13 | 11 | 9 | 82 | 20 | 21 | 19 | 90 | 321 | 336 | 319 | 94 |

| | RB-50 | | | | SWF FEV | | | | TAC B-57 | | | | SWF A30 | | | | SAMPLER B-57 | | | | SAMPLER F-84G | | | | CONTROL B-57 | | | | DOC PHOTO C-54 | | | | AFCRC C-97 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | OPS ORD | SCHED | COMP | PCT COMP | OPS ORD | SCHED | COMP | PCT COMP | OPS ORD | SCHED | COMP | PCT COMP | OPS ORD | SCHED | COMP | PCT COMP | OPS ORD | SCHED | COMP | PCT COMP | OPS ORD | SCHED | COMP | PCT COMP | OPS ORD | SCHED | COMP | PCT COMP | OPS ORD | SCHED | COMP | PCT COMP | OPS ORD | SCHED | COMP | PCT COMP |
| LACROSSE | 2 | 3 | 3 | 100 | 1 | | | | | | | | | | | | 0 | 1 | 1 | 100 | 6 | 6 | 6 | 100 | 1 | 2 | 2 | 100 | 3 | 2 | 2 | 100 | | | | |
| CHEROKEE | 3 | 3 | 2 | 67 | 1 | 1 | 1 | 100 | 1 | 4 | 3 | 75 | 1 | 1 | 1 | 100 | 1 | 4 | 3 | 75 | 6 | 6 | 6 | 100 | 1 | 1 | 1 | 100 | 3 | 3 | 3 | 100 | 1 | 1 | 1 | 100 |
| ZUNI | 3 | 3 | 3 | 100 | | | | | 1 | 4 | 4 | 100 | 1 | 1 | 1 | 100 | 4 | 4 | 4 | 100 | 6 | 2 | 2 | 100 | 1 | 1 | 1 | 100 | 2 | 2 | 2 | 100 | 1 | 1 | 1 | 100 |
| YUMA | | | | | | | | | | | | | | | | | | | | | 6 | 6 | 6 | 100 | 1 | 1 | 1 | 100 | 1 | 2 | 2 | 100 | 1 | 1 | 1 | 100 |
| ERIE | | | | | 1 | 1 | 1 | 100 | | | | | | | | | U | 1 | 1 | 100 | 6 | 6 | 6 | 100 | 1 | 1 | 1 | 100 | 2 | 2 | 2 | 100 | | | | |
| SEMINOLE | 1 | 1 | 1 | 100 | 1 | 1 | 0 | 0 | | | | | | | | | U | 1 | 1 | 100 | 6 | 4 | 6 | 150 | 1 | 1 | 1 | 100 | 2 | 2 | 2 | 100 | | | | |
| FLATHEAD | 3 | 3 | 3 | 100 | 1 | 1 | 1 | 100 | 4 | 4 | 4 | 100 | 1 | 1 | 1 | 100 | 4 | 4 | 4 | 100 | SUPERSEDED | | | | 1 | 1 | 1 | 100 | 2 | 2 | 2 | 100 | 1 | 0 | 0 | 0 |
| BLACKFOOT | | | | | RETURNED TO | | | | | | | | | | | | | | | | 6 | 6 | 6 | 100 | 1 | 1 | 1 | 100 | 2 | 1 | 1 | 100 | | | | |
| EICKAPOO | | | | | KINTELAND | | | | | | | | | | | | | | | | 6 | 6 | 6 | 100 | 1 | 1 | 1 | 100 | 2 | 2 | 2 | 100 | | | | |
| OSAGE | | | | | | | | | | | | | | | | | | | | | 6 | 6 | 6 | 100 | 1 | 1 | 1 | 100 | 2 | 2 | 2 | 100 | | | | |
| DAKOTA | 3 | 3 | 3 | 100 | | | | | 3 | 3 | 3 | 100 | 1 | 1 | 0 | 0 | 4 | 4 | 3 | 75 | 7 | 7 | 4 | 100 | 1 | 1 | 1 | 100 | 2 | 2 | 2 | 100 | 1 | 1 | 1 | 100 |
| INCA | 1 | 1 | 1 | 100 | | | | | | | | | | | | | | | | | 6 | 6 | 6 | 100 | 1 | 1 | 1 | 100 | 2 | 2 | 2 | 100 | | | | |
| MOHAWK | 3 | 3 | 3 | 100 | | | | | | | | | 1 | 1 | 0 | 0 | 4 | 5 | 5 | 100 | 4 | 5 | 2 | 40 | 1 | 1 | 1 | 100 | 2 | 2 | 2 | 100 | 1 | 1 | 1 | 100 |
| APACHE | 3 | 3 | 3 | 100 | | | | | 3 | 3 | 3 | 100 | 1 | 1 | 1 | 100 | 4 | 4 | 4 | 100 | 0 | 4 | 4 | 100 | 1 | 1 | 1 | 100 | 2 | 2 | 2 | 100 | 1 | 1 | 1 | 100 |
| NAVAJO | 3 | 3 | 3 | 100 | | | | | 3 | 3 | 3 | 100 | 1 | 1 | 1 | 100 | 4 | 4 | 4 | 100 | 0 | 4 | 4 | 100 | 1 | 1 | 1 | 100 | 2 | 2 | 2 | 100 | 1 | 1 | 1 | 100 |
| TEWA | | 3 | 2 | 67 | | | | | RETURNED ZI | | | | 1 | 1 | 1 | 100 | | 4 | 4 | 100 | | 4 | 4 | 100 | | 1 | 1 | 100 | | 2 | 2 | 100 | | 1 | 1 | 100 |
| HURON | 3 | 0 | | | | | | | 0 | 0 | | | 1 | 1 | 1 | 100 | 4 | 3 | 3 | 100 | 6 | 4 | 4 | 100 | 1 | 1 | 1 | 100 | 3 | 2 | 2 | 100 | 1 | 1 | 1 | 100 |
| TOTAL | 29 | 29 | 27 | 93 | 5 | 6 | 3 | 75 | 21 | 27 | 24 | 96 | 6 | 9 | 7 | 78 | 37 | 39 | 37 | 97 | 78 | 77 | 78 | 101 | 16 | 18 | 18 | 100 | 34 | 34 | 34 | 100 | 9 | 9 | 9 | 100 |

AFWL/HO

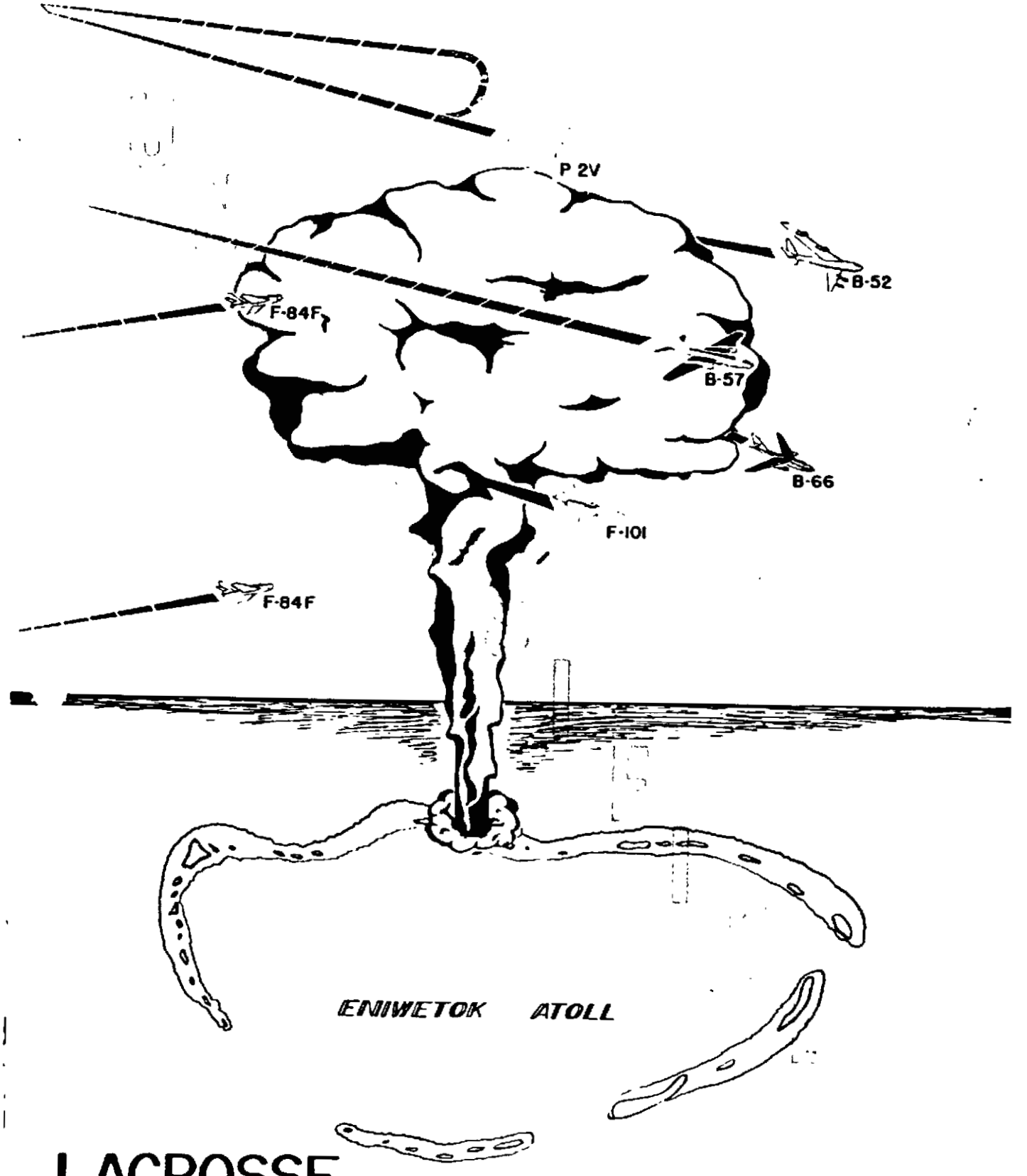
technical reasons, 97 per cent of the scheduled number of aircraft were airborne at the time of shot cancellation.

LACROSSE. The shot schedule for REDWING was changed in late April to provide for firing LACROSSE on 29 April and CHEROKEE on 8 May. After two cancellations, LACROSSE finally was detonated at 0625 hours on 5 May. LACROSSE, [redacted] was detonated at Runit Island (YVONNE), Eniwetok Atoll, from a ground position.

Although 20 aircraft originally were scheduled to take part, 25 finally composed the array and another, the B-66, CLARK, aborted. The B-52, JAYBIRD, originally scheduled, did not participate. Added to the final array were a B-57, CASSIDY 2; a B-57 Sampler, HOTSHOT 1; a B-57, HOTSHOT WEATHER; and three P2V's, BACKDOOR 11, 12, and 13. Primarily controlled by Air Operations Center, all aircraft except the aborted B-66 performed without adverse incident.

The B-66 aborted in flight because of electrical power failure. As the pilot closed his flash curtains at approximately H minus eight minutes, he lost power to his K-5 system and gyro flight instruments. He attempted to fly by partial panel and increased speed in order to position his aircraft safely and remain in the test array. Questionable instrument readings caused him to open his flash curtains, and he discovered that he was coverging on another aircraft. At this point he left the array, returning to base after H-hour without further incident.

[redacted]




# LACROSSE

The four effects aircraft (B-57, KIMONO; F-101, MEREDITH; Capability F-84, WAITER; and Side Loads F-84, BARLEY) were precisely positioned by MSQ-1A radar, with only minor positioning errors.

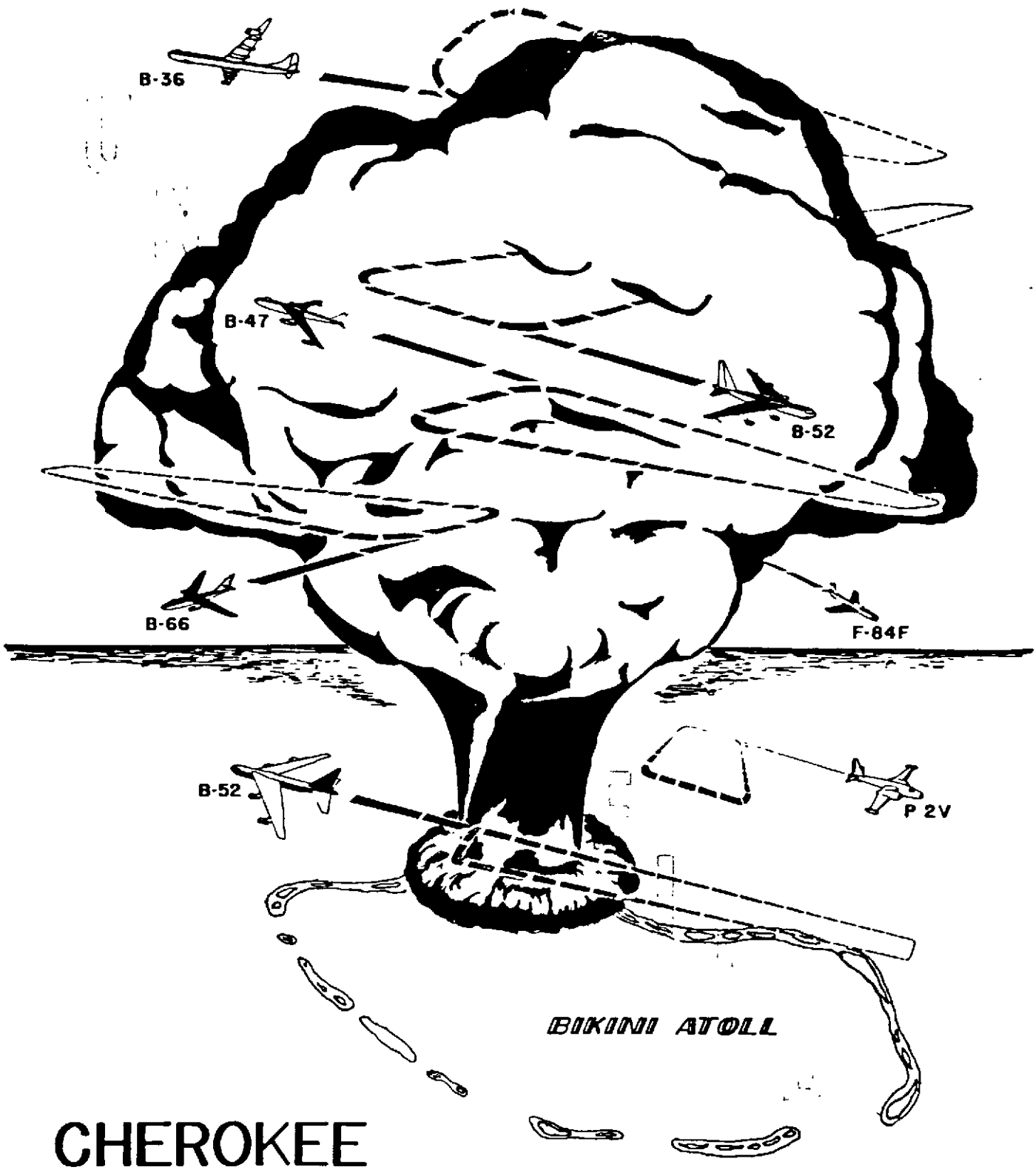
CHEROKEE. Shot CHEROKEE, performed on 21 May at approximately 0550:39 hours, after several postponements because of adverse weather conditions, was [redacted] dropped from a B-52. Two full scale rehearsals and many practice timing and drop missions had prepared the aircraft and crew for the actual drop. One postponement of the drop occurred after the drop aircraft had completed three dry runs on the target.

Plans called for detonation at a height of 5,000 feet over the target on Namu Island, Bikini Atoll, at 0551 hours. Certain untoward events in the operation of the bombing equipment by the bombardier introduced considerable error in the aiming and timing of the device, which detonated some 19,500 feet short of the target, and 21.3 seconds early.

Because of the aiming and timing errors, all effects aircraft had azimuthal errors and horizontal ranges far different from those planned. Most of the data obtained was a result of aircraft positioning procedures which were initiated upon realization that the countdown had become erratic.

According to the Mission Description[1] for CHEROKEE, 42 aircraft were scheduled to participate, including the drop B-52, ZIGZAG, and

[redacted]




# CHEROKEE

AFWL/HO

the canister drop B-36, MALONE. The Mission Execution Chart[2] showed that 38 aircraft took part, under the general control of the Combat Information Center. Effects aircraft were positioned precisely by Raydist.

Effects aircraft which completed the mission were the B-47, SHELDON, the B-52, JAYBIRD, the B-66, CLARK, and the Side Loads F-84, BARLEY. The three remaining effects aircraft (the B-57, KIMONO; the F-101, MEREDITH; and the Capability F-84, WAITER) were aborted by Raydist because of ground equipment malfunction. The bombing difficulty was in no way a cause for these aborts.

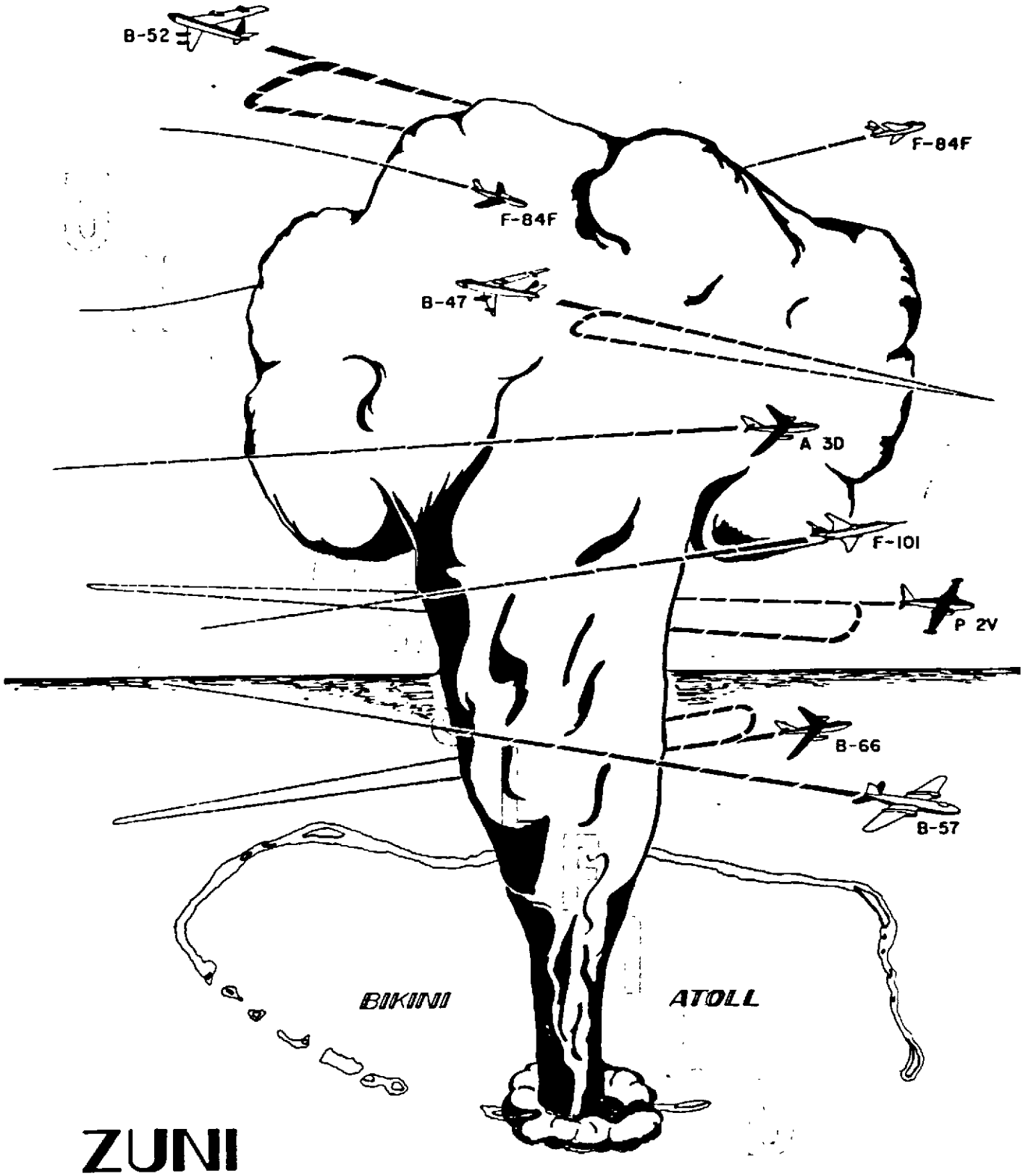
ZUNI and YUMA. On 28 May, Task Group 7.4 had its first test of dual shot capability when ZUNI was fired in the Bikini Atoll and YUMA was fired in the Eniwetok Atoll.

ZUNI, detonated at 0556 hours from a surface mounted position at TARE Island, [redacted] YUMA was [redacted] detonated from a 200-foot tower on SALLY Island.

Fifty aircraft were scheduled for the dual event, of which 11 were for YUMA and 39 for ZUNI. WAITER (Capability F-84) and MEREDITH (F-101), however, were cancelled for instrumentation repair and mechanical maintenance, respectively. All the effects aircraft were scheduled for ZUNI only.

Aircraft for ZUNI were under the general control of the Combat Information Center; those for YUMA were controlled by the Air

[redacted]




# ZUNI

AFWL/HO

Operations Center. In both control centers, communications were excellent, and all aircraft were on time at their positioning reference points.

Effects aircraft participating in ZUNI were the B-47, SHELDON, the B-52, JAYBIRD, the B-66, CLARK, the B-57, KIMONO, and the Side Loads F-84, BARLEY. Four of the effects aircraft made favorable runs with only small positioning errors. The Side Loads F-84, BARLEY, failed to measure significant effects data because of a Raydist controller error, which caused the aircraft to suffer a three-minute timing error.

The B-47, SHELDON, had a 450-degree temperture rise in an aileron panel painted to obtain .80 absorptivity, causing minor permanent buckles in the panel. The B-57, KIMONO, failed to obtain gust data because of a premature turning off of some effects instrumentation in the aircraft.

ERIE. On 31 May, ERIE, [redacted] was detonated from a 300-foot tower on YVONNE Island, Eniwetok Atoll. H-hour was 0615:30.

Seventeen Task Group 7.4 aircraft were scheduled for this event, and two P2V aircraft from Kwajalein were also scheduled to be in the test array for radiological survey purposes. All aircraft, under general control of the Air Operations Center, performed without incident. PEWTER 1, a documentary photography C-54, received

[redacted]

what at first appeared to be minor structural damage from over-pressure. Inspection revealed, however, that the damage resulted from a cowl-flap door malfunction unrelated to the detonation.

Effects aircraft participating were the B-57, KIMONO, the F-101, MEREDITH, and the Side Loads F-84, BARLEY. The B-66, CLARK, was cancelled because of failure of the left engine starter relay. The Capability F-84, WAITER, had been grounded for extensive instrumentation repair and thus was not scheduled. The B-47, SHELDON, and the B-52, JAYBIRD, also were not scheduled for participation in ERIE.

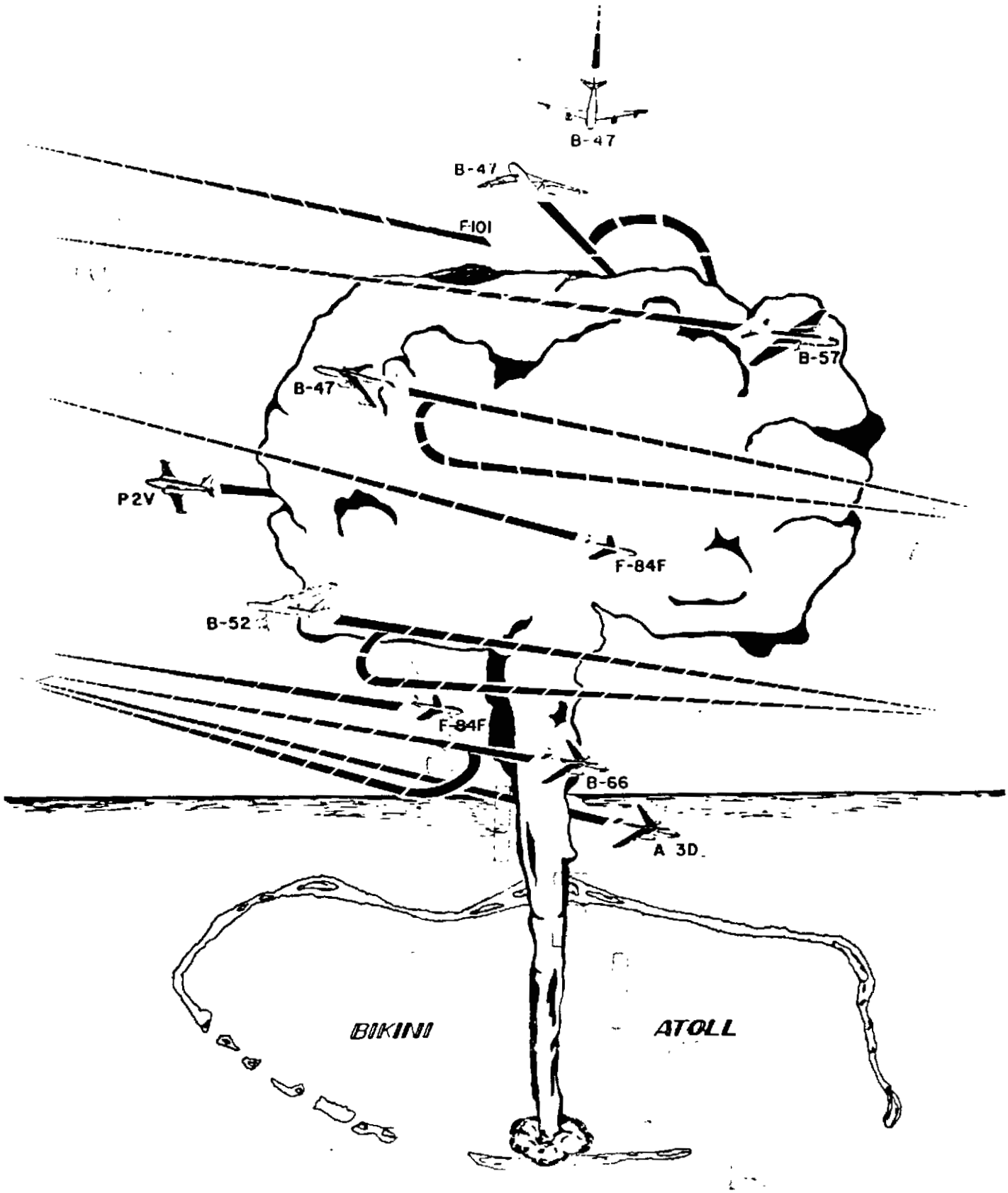
Precise positioning of effects aircraft was accomplished by MSQ-1A radar, and excellent results were obtained.

SEMINOLE. The sixth shot of the 1956 nuclear test series and the fourth to be fired in the Eniwetok Atoll was performed at IRENE Island on 6 June at 1255:30 hours. [redacted]

Fifteen aircraft were scheduled for SEMINOLE, controlled by the Air Operations Center. No effects aircraft participated. The Navy effects P2V, STUDENT, aborted because of engine malfunction, but all other aircraft completed the mission satisfactorily.

FLATHEAD and BLACKFOOT. The second dual shot of the REDWING series occurred on 12 June, when FLATHEAD and BLACKFOOT were fired simultaneously at 0626. This event was the culmination of several

[redacted]




# FLATHEAD

AFWL/HO

unsuccessful attempts during the 9-12 June period to detonate the two weapons. Schedules for the two shots underwent a total of seven changes, caused primarily by poor weather conditions, before the shots finally were accomplished.

FLATHEAD was [redacted] fired from a barge off DOG Island, Bikini Atoll; BLACKFOOT was [redacted] fired from a 200-foot tower at YVONNE Island, Eniwetok Atoll.

Thirty-three aircraft were scheduled for the FLATHEAD shot, controlled primarily by the Combat Information Center. All aircraft, except the B-52, JAYBIRD, which aborted because of radar malfunction, completed the mission without incident. Nine aircraft participated in the BLACKFOOT shot, being controlled by the Air Operations Center. No aborts occurred.

All seven effects aircraft were in the test array at Bikini, and all except the B-52 completed the mission satisfactorily. The B-66, CLARK, experienced considerable difficulty in the K-5 system but was positioned successfully through visual reference to the target. Raydist, which conducted precise control, functioned better than during any previous shot.

KICKAPOO. On 14 June, KICKAPOO, [redacted] was fired from a 300-foot tower at SALLY Island, Eniwetok Atoll. H-hour was 1126, although the original shot time had been scheduled for 0756 and had been changed several times.

[redacted]

Eleven aircraft were scheduled for KICKAPOO, and none was cancelled or aborted. Air Operations Center activities were performed without adverse malfunction.

This was a very important event for the F-101, MEREDITH, the only effects aircraft to participate. Since only one other weapon (OSAGE) of the [redacted] yield of KICKAPOO was scheduled for REDWING and since no effects aircraft were to participate in OSAGE, it was almost imperative that the F-101 fly in the KICKAPOO event. However, the F-101 had been grounded for replacement of a control stick bearing. An exceptional release of the aircraft from its grounding, after a thorough inspection, made the aircraft available for the shot. After the shot had been postponed twice with the F-101 airborne, the endurance capability of the aircraft to remain airborne for another attempted H-hour was questioned. A decision from the Joint Task Force Command Post thus cancelled the aircraft's participation and ordered another immediate H-hour. The Effects Element Commander and the Commander of Task Group 7.4 requested and received a later H-hour which would allow the aircraft a minimum time to re-service and return to orbit. The aircraft landed, returned to the ramp and was refueled, the aircraft was put on jacks and the struts were bled, a new brake chute was installed, cameras and frame counters were run back and re-set, and ice was replenished in the thermocouple junction box. The aircraft was airborne again

[redacted]

in 22 minutes after landing. Controlled precisely by MSQ-1A radar, the F-101 was on track and on time at time zero.

OSAGE. To prepare for the OSAGE drop, the B-36 aircrew at Kirtland Air Force Base in May 1956 performed several practice drop and timing missions. On 1 June, the B-36 released four 500-pound bombs visually for an average circular error of 275 feet, and four 500-pound bombs by radar for an average circular error of 314 feet. It also released two T-62 shapes (training bomb with a [redacted] configuration) for an average circular error of 112 feet. On timing missions, the timing error averaged three seconds.

OSAGE, on 16 June the second airdrop of the 1956 nuclear test series, was [redacted] aimed at a ground target on YVONNE Island, Eniwetok Atoll. The weapon burst at 700 feet altitude, producing the expected low yield.

Some difficulty was encountered with the B-36 automatic pilot, and after four dry runs the first scheduled H-hour, 0826, was abandoned. The aircraft landed and failed to make a second scheduled take-off because the automatic pilot difficulty had not yet been resolved. The second bombing attempt was completed visually at 1314 hours after five dry runs and two live runs, of which the first live run was aborted because of a cloud cover over the target. Bombing accuracy was considered excellent, with a circular error of approximately 185 feet.

No effects aircraft participated in this event. Twelve other aircraft, controlled by the Air Operations Center, took part. None of those scheduled was aborted or cancelled.

INCA. On 22 June at 0956 hours, INCA was detonated at PEARL Island, Eniwetok Atoll, from a 200-foot tower. [redacted]

[redacted]

This shot had been planned to be a dual event with DAKOTA; however, DAKOTA was cancelled because of adverse weather in the Bikini Atoll. Aircraft thus scheduled for the DAKOTA shot were transferred to the INCA array and successfully completed the mission. Many of the aircraft returning from Bikini landed, refueled, re-instrumented, and joined the INCA pattern, emphasizing again the dual shot capability of Task Group 7.4.

Three controllers in the Air Operations Center handled control activities without malfunction, and communications facilities, although crowded, operated astisfactorily. Twelve aircraft, including three effects aircraft, participated in the INCA shot.

The three effects aircraft scheduled for INCA were among the first to be recovered from the DAKOTA mission, which was cancelled at 0616 hours. The B-57, KIMONO, blew a tire upon landing and required tire changes on both main gears and a landing gear retraction test before it could be dispatched for the second mission. Arrangement, therefore, was made for a slight delay in the scheduled

[redacted]

H-hour to allow time for the effects aircraft to reach appointed positions.

During the process of preparing the B-57 for the second mission, certain switches in the recorder circuits of recording instruments were not closed; consequently, although the aircraft was in proper position at time zero, no data were recorded.

The B-66, CLARK, when turning on the final positioning run, was five seconds late, an amount of time too large to reduce before time zero. Therefore, for safety reasons, the pilot decided to abort.

The F-101, MEREDITH, was on time and in excellent position, precisely controlled by MSQ-1A radar. Minor blistering occurred in the protective coating on the left wing tip, but the aircraft suffered no other difficulty.

After the last aircraft left the DAKOTA array, the Combat Information Center aboard the USS Estes experienced a complete shutdown; the ship's engine room lost steam, resulting in a complete power loss. An attendant fire in the radio room in conjunction with the power loss thus deprived the Center of communications and control facilities. The power loss lasted only some 15 minutes but made apparent the need for a back-up system of aircraft recovery in event of future incidents of the same nature. Therefore, a provision was made to place Air Force personnel in the Combat

[redacted]

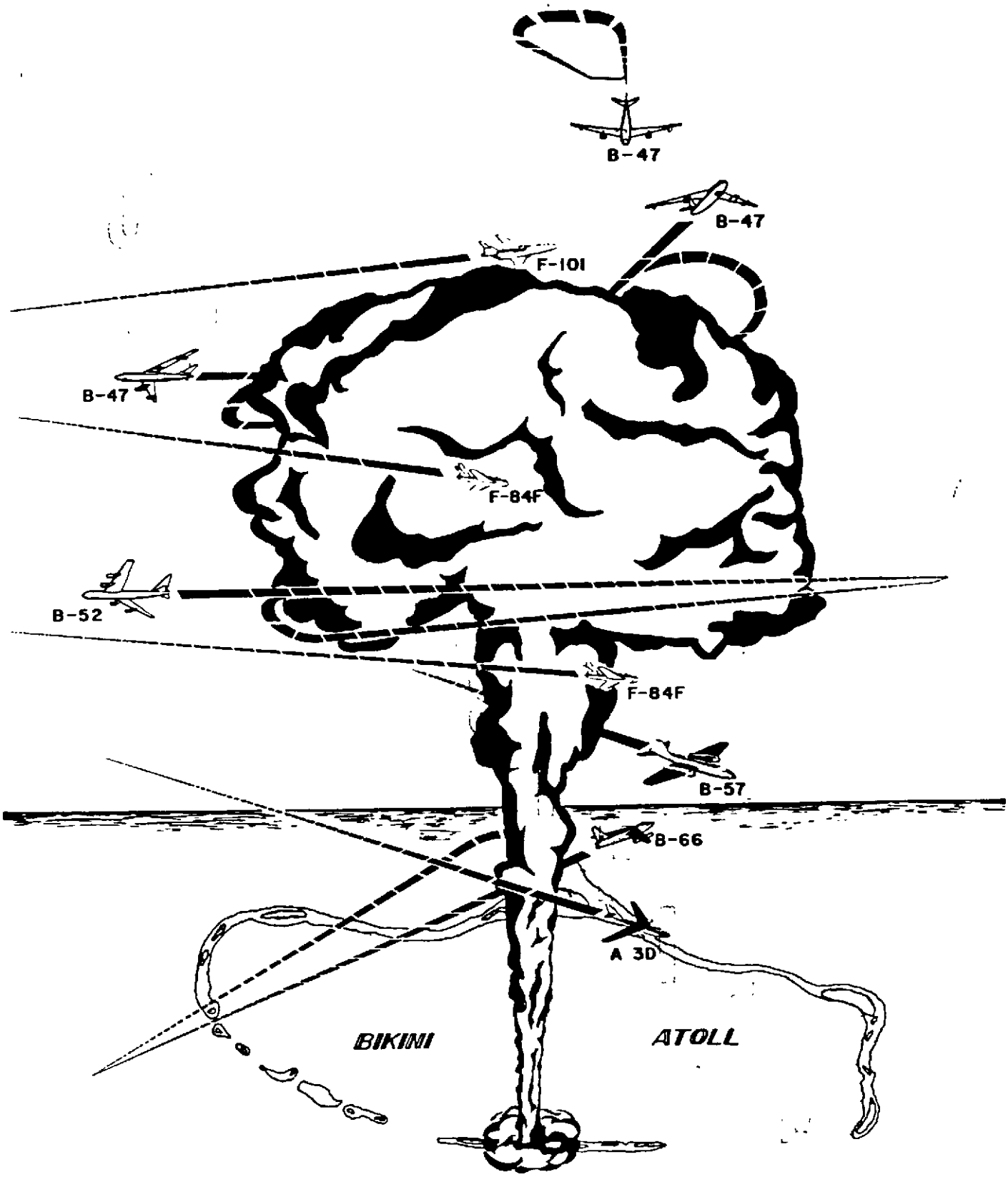
Information Center of another surface vessel to guard two of the primary control channels and to transmit instructions to all aircraft should the USS Estes facilities again become inoperative.

DAKOTA. [redacted] was detonated on 26 June at 0606 hours from a barge off DOG Island, Bikini Atoll. Thirty-four primary aircraft were scheduled, of which one cancelled (the Navy effects A3D, LENA) because of maintenance difficulty.

The aircraft were under the primary control of the Combat Information Center, which had three short duration power failures during the mission, causing the loss of Identification Friend or Foe radar and ultra high frequency radio. The failures occurred, however, after the return of critically positioned aircraft to the Air Operations Center control.

Several of the effects aircraft received structural damage in the DAKOTA mission. The B-47, SHELDON, experienced extensive buckling in painted panels and pronounced torsional wrinkling in the bomb bay doors. The B-66, CLARK, sustained light scorching of hardware paint, small buckles in gray painted panels of the elevator and aileron, and burning of elevator balance seals. The B-57, KIMONO, had extensive blistering and charring of black paint on thin skin areas throughout the lower side of the fuselage, wings, and tail; there was no significant buckling, and no permanent buckling remained. The Capability F-84, WAITER, received a pronounced

[redacted]




# DAKOTA

AFWL/HO

buckle in the trailing edge of the right wing flap, skin buckles on the fuselage underside, and a bent engine tailpipe brace. The Side Loads F-84, BARLEY, received no damage. The F-101, MEREDITH, returned to base with a de-laminated honeycomb section in the black-painted right wing tip, and widespread charring and buckling in flat aluminum painted areas, but no damage to unpainted areas.

Since the DAKOTA yield reached unexpected proportions, damage to the flaps of the B-52, JAYBIRD, was a possibility; therefore, while the aircraft was still airborne a decision was made for the B-52 to proceed to Hickam Air Force Base, where the aircraft could be landed safely in case of flap, brake, or brake chute failure resulting from gust damage. The aircraft, successfully landing at Hickam, was found to have only minor blistering of paint in isolated areas and a small dish-like dent in one wheel well door. No damage to wing flaps was evident.

MOHAWK. [redacted]

MOHAWK was detonated from a 300-foot tower on RUBY Island, Eniwetok Atoll, on 3 July at 0606 hours.

Twenty-eight primary aircraft were scheduled for this event, of which one, the effects B-57, KIMONO, aborted because of malfunction of the MSQ receiver. The aircraft were controlled primarily by the Air Operations Center; effects aircraft were under the precision control of MSQ-1A radar.

[redacted]

Weather on this shot day was worse than usual; the area surrounding ground zero and Eniwetok Atoll contained huge cloud build-ups and heavy rain showers. Aircraft take-offs, however, occurred without incident, mostly under instrument conditions. All aircraft were on time at designated positions except for the aborted KIMONO and for the F-101, MEREDITH, which at supersonic speed was approximately four seconds late at time zero. All aircraft were recovered successfully after the shot. The pilot of the Capability F-84, WAITER, declared an emergency at approximately H plus one minute because of the presence of smoke in the cockpit. The controller descended the aircraft immediately to initial approach for landing, and the aircraft landed without difficulty.

No discrepancies were noted in the operation of the Air Operations Center.

APACHE. On 9 July at 0606 hours, APACHE, [redacted] was fired from a barge off FLORA Island, Eniwetok Atoll.

The first attempt at APACHE was made on 8 July, but the event was cancelled because of changing winds after a number of aircraft were airborne. Low clouds obscured the target most of the planned pre-shot period. The second attempt, on 9 July, was successful, and though favorable winds existed, general weather conditions were no better than on the preceding day.

[redacted]

Thirty-five primary aircraft were scheduled for APACHE, and no aborts occurred. Positioning by the Air Operations Center and MSQ-1A radar was performed without difficulty. All seven effects aircraft participated.

NAVAJO. NAVAJO was [redacted] detonated on 11 July at 0556 hours, from a barge off DOG Island, Bikini Atoll.

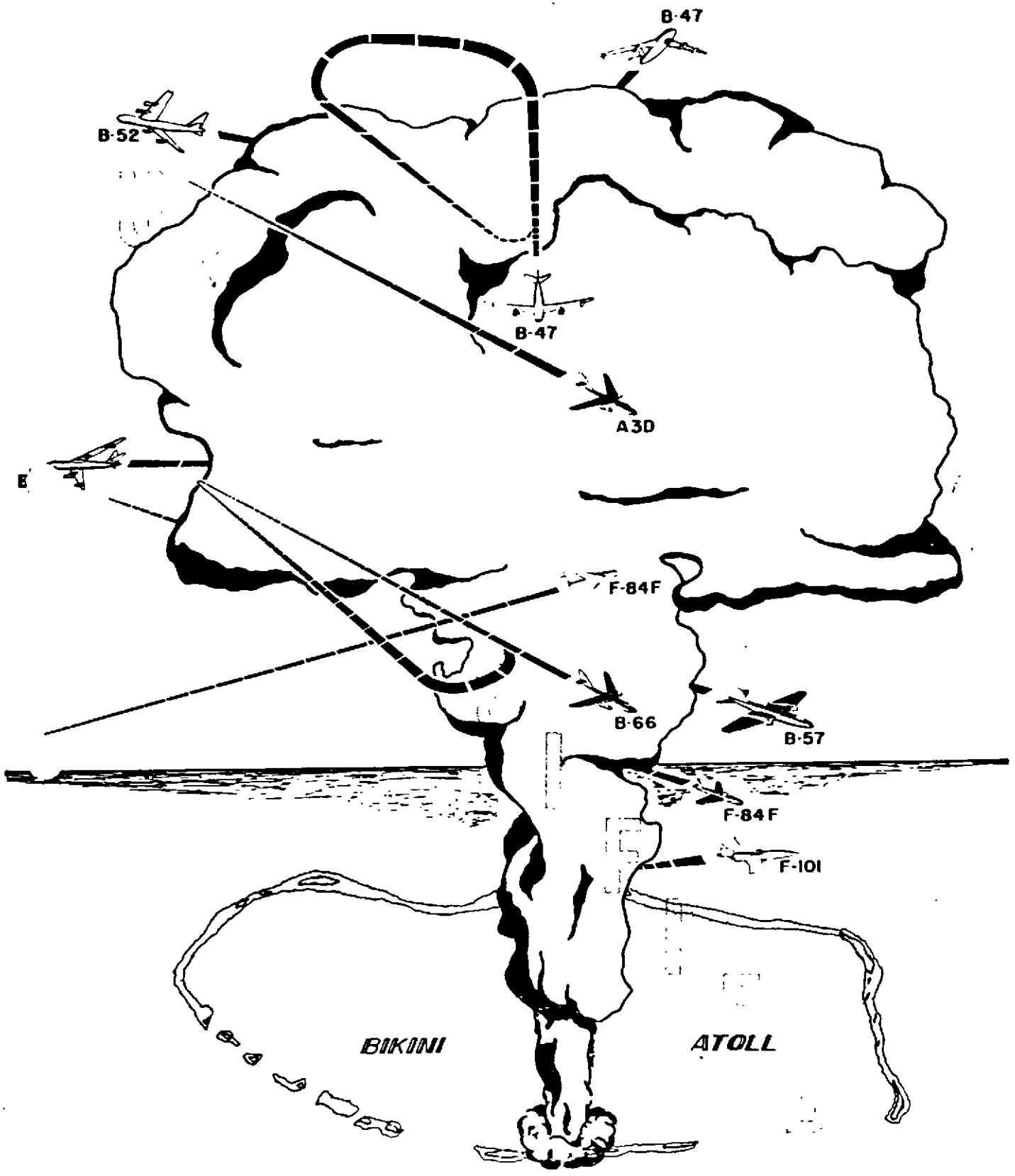
Thirty-five aircraft were scheduled to participate. No aborts occurred, and all aircraft performed successfully, although the B-66, CLARK, was 28 seconds late at the initial point, while the maximum allowable error was 20 seconds. CLARK went into a pre-planned secondary tail-on position which purposely gave loads considerably less than those the primary position was expected to give. The secondary position, therefore, was made good.

Two countdowns were heard by several aircraft and the Air Operations Center, one from Station 70 and one from Parry Island (Eniwetok Atoll), the last named being out of order. The countdown from Parry was audible to all aircraft in the shot array at 25,000 feet or higher but not to those at lower altitudes.

The aircraft were positioned primarily by the Combat Information Center, and no control difficulties were experienced.

The NAVAJO mission was the last required for collection of necessary data on the Capability F-84, BARLEY, and the F-101, MEREDITH. Furthermore, the Capability F-84 was no longer fit for shot participation because of general structural loosening, increasing

[redacted]




# NAVAJO

AFWL/HO

instability, and a wrinkle in the right wing. These conditions were considered to be largely a result of high loads received in the DAKOTA shot. The Capability F-84 and the F-101, therefore, were taken from active flying status and prepared for shipment to the Zone of Interior.

TEWA. Fired from a barge off DOG Island, Bikini Atoll, on 21 July at 0546 hours, [redacted]

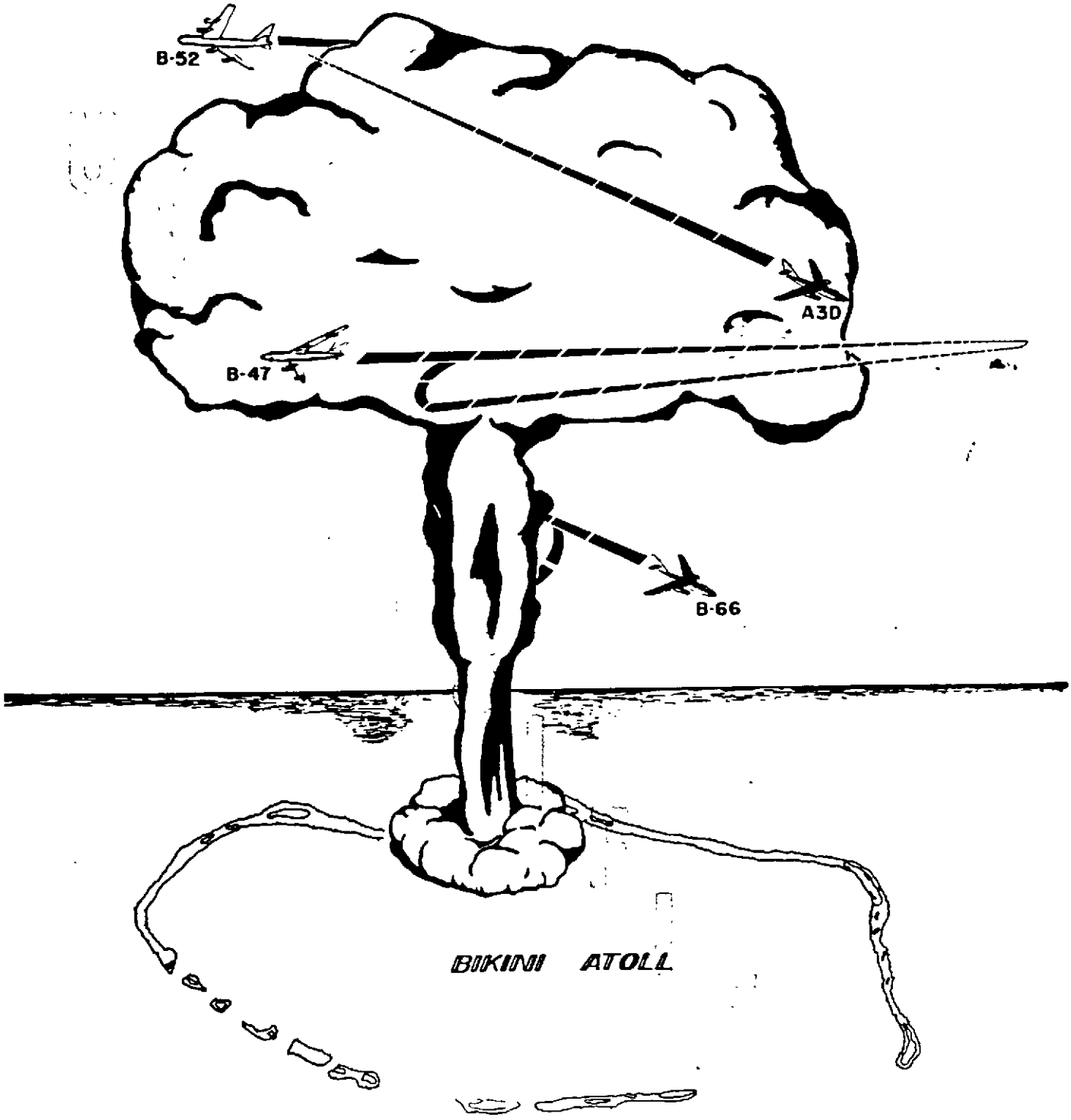
Twenty-four aircraft took part in the shot, primarily controlled by the Combat Information Center. A B-57, HOTSHOT 2, aborted because of an Identification Friend or Foe radar malfunction.

Three effects aircraft, although not originally planned for participation in TEWA, were admitted to the test array. The three aircraft were the B-47, SHELDON, the B-52, JAYBIRD, and the B-66, CLARK, all of which obtained excellent data, especially in the intermediate range of loads.

HURON. The last shot of the REDWING series was detonated at 0616 on 22 July. The shot had been scheduled for 20 July but was cancelled because of adverse winds after nine aircraft were airborne.

HURON was [redacted] fired from a barge off FLORA Island, Eniwetok Atoll.

Twenty-one aircraft were scheduled for the shot, and all aircraft performed without incident. On the attempt on 20 July, [redacted]




# TEWA

AFWL/HO

the Identification Friend or Foe radar of the Air Operations Center was inoperative until 1015 hours, when a shorted cable in the antenna was found and the short corrected. The malfunction, however, was not a contributing cause for the cancellation of the shot. When the shot finally was fired, the Air Operations Center operated without difficulty.

Low and medium clouds obscured the target for the Documentary Photography C-54, PEWTER, aircraft. All quadrants, except the south, were unpropitious for photography. As a result, both PEWTER aircraft were placed in the same orbit, separated by 1,000 feet altitude, 180 degrees from ground zero. Sampling, too, was hampered by frequent thunderstorm activity, but adequate samples were acquired.

Five effects aircraft participated, precisely controlled by MSQ-1A radar. The B-47, SHELDON, sustained considerable wrinkling in the bomb bay door, similar to the DAKOTA effects. Damage to the B-57, KIMONO, was confined to insignificant scorching of black painted areas. The B-66, CLARK, received minor scorching of some seals and paint and partial melting of plastic antenna shields alongside the aft fuselage. The other participating effects aircraft (the B-52, JAYBIRD, and the Side Loads F-84, BARLEY) received no noteworthy damage.

## Air Operations Control

In accordance with the air operations control concept for REDWING, the control of aircraft was accomplished by the Air [redacted]

AFWL/HC

Operations Center and MSQ-1A radar on Eniwetok shots and by the Combat Information Center and Raydist on Bikini shots. Although adequate for gross positioning and over-all control, neither the Air Operations Center nor the Combat Information Center was suited for precise positioning of the effects aircraft which assumed critical positions in the test arrays. At Eniwetok the four MSQ-1A radar units, and at Bikini the Raydist system, were effective in providing this precise control. However, considerable difficulty was experienced throughout the test series with the Raydist system, which was yet in a developmental stage. Much of this difficulty was caused by mechanical malfunctions. Virtually all outstanding control problems were confined to the Combat Information Center and Raydist.

Despite maximum cooperation by Navy communications personnel, weaknesses were obvious in the Combat Information Center control system, most of which were the result of deficiencies in the equipment aboard the USS Estes. Most of the ultra high frequencies were weak, several were extremely undependable, and frequently one or more channels had to be abandoned temporarily for retuning. Ultra high frequency range capability also was erratic, and often aircraft stationed from 50 to 120 miles from Ground Zero to maintain contact had to resort to high frequency, which was available. Sampler aircraft, sometimes required to move out to 200 miles or more, were at times literally uncontrolled.

[redacted]

AFWL/HO

The range of the IFF from the Combat Information Center was so erratic that occasionally the more remote aircraft in the array could not be seen on the scope. When aggravated by unreliable radio communications, this condition of the IFF left the task group Commander without constant control of aircraft in the array.

In the Combat Information Center, the scopes, communications, and controller system was so established that only six scopes could be used for position control and each controller could monitor only one frequency at a time. If five of the six scopes were used for control of clear-channel aircraft (that is, critically positioned aircraft), the other 20 to 30 aircraft would have to be handled on the remaining scope on a single frequency, a manifestly unfeasible procedure. Consequently, it was necessary (a) to have each clear-channel controller on his scope handle additional aircraft with which he was not in constant radio contact, or (b) to control these aircraft on an interference basis on the single channel which he could monitor continually. Neither solution was entirely satisfactory. To complicate the latter choice was the fact that the tone positioning signals of the Raydist system were transmitted on the ultra high frequency carrier frequency and were intolerable to pilots over a prolonged period. Not only were the tones unbearable for disinterested pilots who were forced to share the frequency, but the effects aircraft pilots objected so strenuously that finally a very high frequency channel was used for data

[redacted]

transmission between Raydist control and each aircraft. This solution eliminated only the noise nuisance, and there remained a requirement for a clear ultra high frequency channel over which Raydist controllers could supplement verbally the tone control signals transmitted on the very high frequency carrier frequency.

In the USS Estes Combat Information Center, the lack of interphone communications between the command and controller stations resulted in a general increase in the noise level and served to disturb control functions generally.

The Task Group 7.4 Commander in his Final Report indicated that the control capability of the Combat Information Center should be increased for future test operations. To increase this capability he recommended strongly that provision be made for dependable ultra high frequency radio and IFF radar ranges up to 200 miles, that each controller be enabled to monitor a minimum of four frequencies but preferably all frequencies, and that an intercommunication system be established among the various command and control points in the Center.

Maintenance Control. The Maintenance Control Unit, consisting of the task group Maintenance Officer and nine airmen, was established by the Director of Materiel soon after the group's arrival at Eniwetok, to assist the aircraft maintenance organizations in performing the maintenance mission.

[redacted]

## AIRCRAFT INVENTORY BY TYPE

| | AIRCRAFT TYPE | 1956 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | JAN | FEB | MAR | APR | MAY | JUNE | JULY | AUG |
| TAU | B-52 | | | 1 | 1 | 3 | 1 | 1 | 0 |
| | B-47 | | | 1 | 1 | 4 | 4 | 4 | 0 |
| | B-36 | | | | | 1 | 1 | 0 | 0 |
| | B-66 | | | 1 | 1 | 1 | 1 | 1 | 0 |
| | B-57 | | | 7 | 7 | 12 | 12 | 12 | 0 |
| | C-97 | | | | | 1 | 1 | 1 | 0 |
| | F-84 G | | | 10 | 10 | 10 | 10 | 10 | 0 |
| | F-84 F | | | 2 | 2 | 2 | 2 | 2 | 0 |
| | F-101 | | | 1 | 1 | 1 | 1 | 1 | 0 |
| | A3D | | | 1 | 1 | 1 | 1 | 1 | 0 |
| | P 2V | | | 1 | 1 | 1 | 1 | 0 | 0 |
| TSU | RB-50 | | | | | 3 | 3 | 3 | 0 |
| | WB-50 | | | 10 | 10 | 10 | 10 | 10 | 0 |
| | C-54 | | | 3 | 3 | 3 | 3 | 3 | 0 |
| | SA-16 | | | 6 | 7 | 7 | 7 | 7 | 0 |
| TBU | C-47 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| | H-19 | 4 | 10 | 10 | 10 | 10 | 10 | 10 | 4 |
| | L-20 | 6 | 6 | 6 | 8 | 8 | 8 | 8 | 6 |
| | L-21 | | | 1 | 1 | 1 | 1 | 1 | 0 |
| | | | | | | | | | |
| TOTAL | | 14 | 20 | 65 | 68 | 83 | 81 | 79 | 14 |

## FIELD MAINTENANCE MAN HOURS

| | DIRECT SUPPORT | | | INDIRECT SUPPORT | | |
|---|---|---|---|---|---|---|
| SHOP | MAY | JUN | JUL | MAY | JUN | JUL |
| MACHINE | 1209 | 877 | | 241 | 407 | |
| ELECTRIC | 1462 | 1169 | | 111 | 128 | |
| SHEET METAL | 1760 | 1593 | | 207 | 200 | |
| HYDRAULIC | 834 | 715 | | 13 | 0 | |
| CARPENTER | 1315 | 649 | | 57 | 231 | |
| PAINT SHOP | 959 | 700 | | 122 | 132 | |
| PROP SHOP | 1247 | 894 | | 407 | 233 | |
| WELDING | 765 | 705 | | 65 | 54 | |
| ENGINE BUILDUP | 2747 | 2306 | | 167 | 184 | |
| RADIO AND RADAR | 3424 | 2878 | | 866 | 953 | |
| PARACHUTE | 1029 | 874 | | 64 | 99 | |
| INSTRUMENT | 998 | 789 | | 227 | 176 | |
| AUX. MAINT. | 3166 | 3232 | | 855 | 1495 | |
| TOTAL | 20,915 | 17,381 | | 3402 | 4292 | |

AFWL/HO

To enable Maintenance Control to expedite maintenance, to acquire supplies, and to supervise maintenance technicians, a Control Unit communications network was established. Intercommunications connections were provided between the various maintenance and supply offices and the offices of the group Commander, Director of Materiel, and Maintenance Control. Two-way radios in vehicles and in the Unit office provided communications to the flight line maintenance stations.

All requests for maintenance assistance, urgently needed aircraft parts, fuel servicing, fire guards, hangar space, and use of the wash rack were channeled through Maintenance Control and assigned priorities consistent with mission requirements. Materiel requirements were passed to the Control Unit Supply Technician, who did research on the required parts to verify availability. To effect rapid maintenance, a radio-equipped vehicle was dispatched to obtain the part and accelerate its delivery. In cases of unavailability of parts in the proving ground, a message request for parts was sent immediately to the task group Logistics Liaison Officer at the Sacramento Air Materiel Area, and the Control Unit continued to follow the acquisition process until the parts were received and installed in the aircraft.

Throughout Operation REDWING, the aircraft in-commission rate was 76 per cent and the rate for aircraft out of commission for

[redacted]

## AIRCRAFT FLYING TIME

### 30 Day Average per Aircraft

| TEST BASE UNIT | NR ASGD | MARCH | APRIL | MAY | JUNE |
|---|---|---|---|---|---|
| L-20A | 8 | 36 | 67 | 66 | 65 |
| C-47 | 4 | 67 | 68 | 82 | 59 |
| L-21 | 1 | 0 | 31 | 46 | 56 |
| H-19 | 10 | 25 | 53 | 49 | 44 |
| **TEST SERVICE UNIT** | | | | | |
| Weather Recon WB-50 | 10 | 35 | 78 | 89 | 107 |
| Tech Photo RB-50 | 3 | 48 | 31 | 24 | 19 |
| SAR SA-16 | 7 | 47 | 50 | 69 | 59 |
| Doc Photo C-54 | 3 | 290 | 55 | 64 | 79 |
| **TEST AIRCRAFT UNIT** | | | | | |
| Sampling & Decon | | | | | |
| JB-57 | 6 | 57 | 22 | 22 | 17 |
| JF-84G | 10 | 9 | 20 | 21 | 17 |
| WADC Effects | | | | | |
| B-47 | 1 | 25 | 38 | 42 | 40 |
| B-52 | 1 | 25 | 41 | 30 | 27 |
| B-66 | 1 | 19 | 8 | 27 | 20 |
| B-57 | 1 | 25 | 23 | 30 | 12 |
| F-84F | 1 | 15 | 21 | 23 | 17 |
| F-101 | 1 | 0 | 17 | 17 | 14 |
| Navy Effects | | | | | |
| A3D | 1 | 0 | 47 | 48 | 20 |
| P2V | 1 | 109 | 64 | 51 | - |
| IBDA | | | | | |
| B-47 | 3 | 0 | 28 | 27 | 21 |
| Ionosphere | | | | | |
| C-97 | 1 | 0 | 51 | 40 | 51 |
| Early Penetration | | | | | |
| B-57B | 4 | 0 | 0 | 20 | 19 |

parts was 1.9 per cent. These percentages give an indication of the value to REDWING of the Maintenance Control Unit system and of the efficiency of the procedure for emergency procurement of supplies and equipment.

An important part of the Maintenance Control Unit was the emergency team, constituted to effect the rapid removal of immobilized aircraft from the Eniwetok runway in case of accident.

On 16 June, a C-124 of the Military Air Transport Service crashed on the Eniwetok runway, shearing off the landing gear. The aircraft burned partially. The emergency team assisted in the removal operation, and the runway was re-opened to normal traffic the following morning.

## Airlift

Airlift for REDWING was divided into three categories, inter-island airlift, inter-atoll airlift, and resupply of Weather and Project Islands. The inter-island airlift involved the servicing of sites within the Eniwetok and Bikini Atolls. The Bikini phase was, in the main, accomplished by a squadron of 15 Marine helicopters. Late in March 1956, however, the Marine helicopters were grounded because of an aircraft accident, and, to provide the necessary Bikini airlift, five Task Group 7.4 H-19B's were transferred from Eniwetok. Five other H-19B's were sent from Eniwetok to Bikini early in April, giving the Scientific Task Group (7.1), whose

[redacted] [redacted]

BEGIN 1 FEB 56

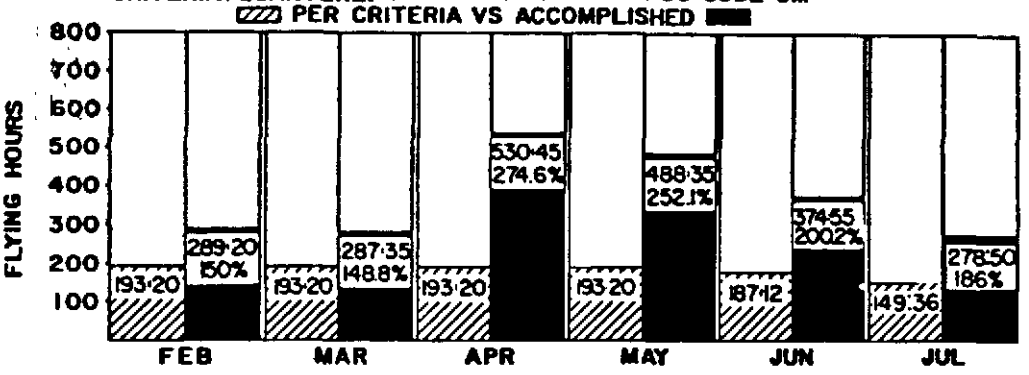
# H-19

END 22 JULY 56

## UTILIZATION

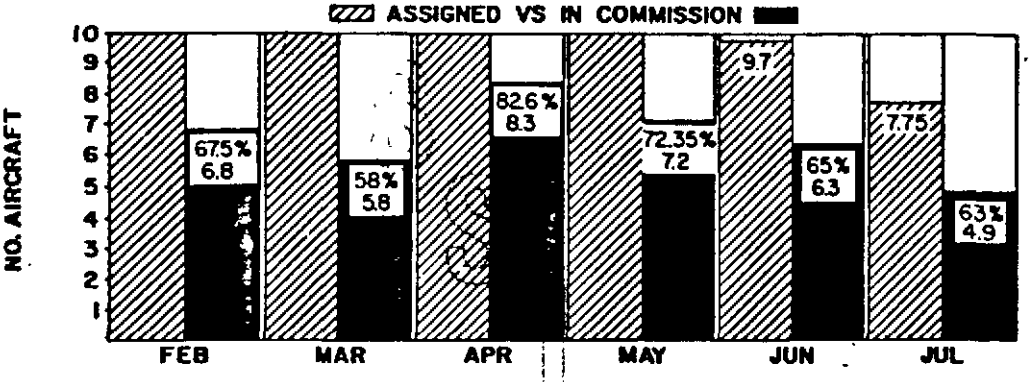
CRITERIA: QUARTERLY FLYING HOUR FACTOR 58 CODE CM

▨ PER CRITERIA VS ACCOMPLISHED ■




## IN COMMISSION RATE

▨ ASSIGNED VS IN COMMISSION ■




## HOURS FLOWN PER AIRCRAFT IN COMMISSION AND ASSIGNED

| | FEB | MAR | APR | MAY | JUN | JUL |
|---|---|---|---|---|---|---|
| TOTAL HOURS FLOWN | 282:25 | 289:15 | 526:10 | 486:05 | 374:55 | 278:50 |
| AIRCRAFT ASSIGNED | 10 | 10 | 10 | 10 | 9.7 | 7.75 |
| HRS FLOWN PER A/C ASSIGNED | 28.14 | 28 56 | 52 37 | 48:37 | 38:39 | 35.58 |
| NO. A/C IN COMMISSION | 6.8 | 5.8 | 8.3 | 7.2 | 6.3 | 4.9 |
| HRS FLOWN PER A/C IN COMMISSION | 41 30 | 49 54 | 63 24 | 66:30 | 59:30 | 56:54 |

AFWL/HQ

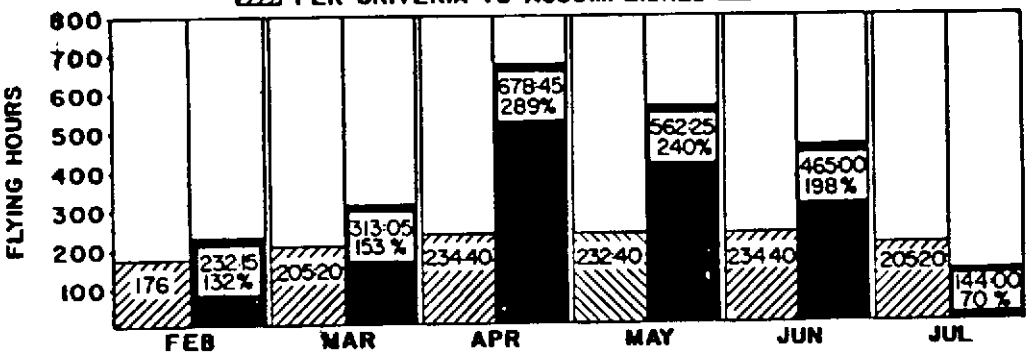
BEGIN 1 FEB 1956

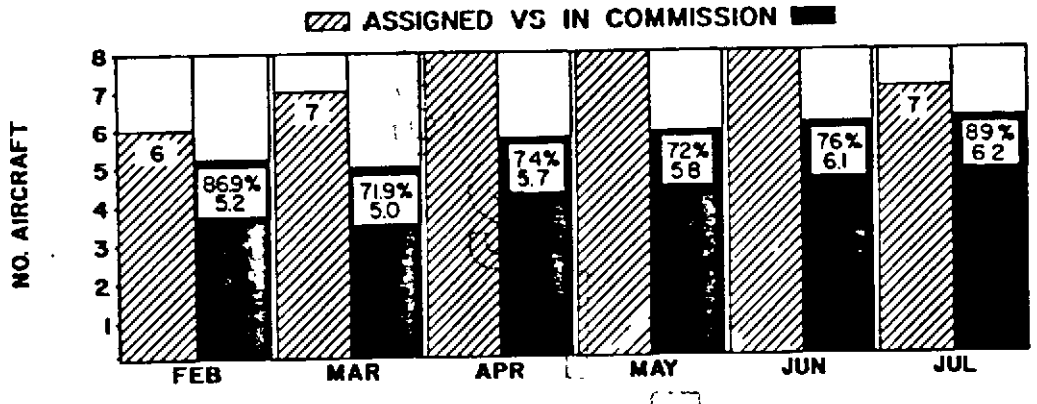
# L-20

END 22 JULY 1956

## UTILIZATION

CRITERIA: QUARTERLY FLYING HOUR FACTOR 88 CODE CM




HRS FLOWN PER AIRCRAFT IN COMMISSION AND ASSIGNED

| | FEB | MAR | APR | MAY | JUN | JUL |
|---|---|---|---|---|---|---|
| TOTAL HOURS FLOWN | 232:15 | 313:05 | 678:45 | 562:25 | 465:00 | 144:00 |
| AIRCRAFT ASSIGNED | 6 | 7 | 8 | 8 | 8 | 7 |
| HRS FLOWN PER A/C ASSIGNED | 38:43 | 44:43 | 84:50 | 70:18 | 58.06 | 20:36 |
| NO. A/C IN COMMISSION | 5.2 | 5.0 | 5.7 | 5.8 | 6.1 | 6.2 |
| HRS FLOWN PER A/C IN COMMISSION | 44.42 | 62.36 | 118.12 | 97:00 | 76:12 | 23:13 |

AFWL/HO

operations at Bikini were vital to REDWING, access to ten Task Group 7.4 helicopters. The ten aircraft were returned to Eniwetok on 28 April, having flown some 487 hours in direct support of Task Group 7.1 at Bikini. The Marine squadron resumed airlift operations after departure of the Air Force aircraft.

At Eniwetok, the ten H-19B's, a Tactical Air Command contribution to REDWING, performed the airlift mission to sites where no landing strips were available. Eight L-20 aircraft of the Test Base Unit fulfilled commitments to five sites where landing strips were available. When the H-19B's were in use at Bikini during March and April, the Eniwetok airlift capability was reduced considerably although the increased utilization of L-20's and the greater use of water transportation prevented a serious reduction of over-all capability.

From 1 February through 22 July, H-19 aircraft of Task Group 7.4 flew 2,250 hours, transporting 12,374 passengers and 12.79 tons of cargo. During the same period, L-20 aircraft flew approximately 2,395 hours, transporting 18,201 passengers and 10.59 tons of cargo.

Inter-atoll airlift was defined as airlift between Eniwetok and Bikini. The majority of this airlift was accomplished by four C-47 aircraft of the Test Base Unit. The three C-54 aircraft of the Documentary Photography Element (Air Support), Test Services

[redacted]

AFWL/HO

BEGIN 23, MAR, 1956

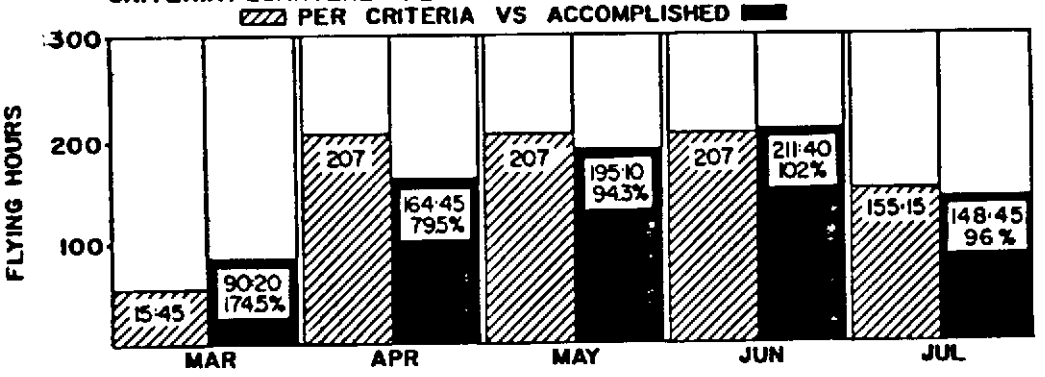
# C-54

END 22, JULY, 1956

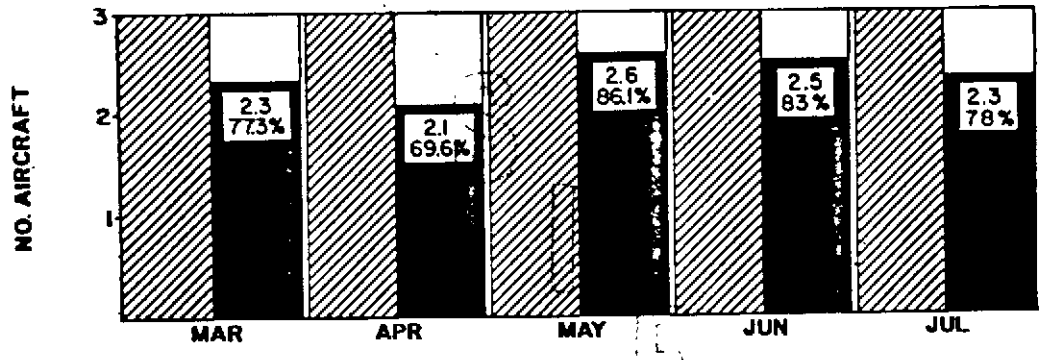
## UTILIZATION

CRITERIA: QUARTERLY FLYING HOUR FACTOR 207 CODE CM

PER CRITERIA VS ACCOMPLISHED




ASSIGNED VS IN COMMISSION




## HOURS FLOWN PER AIRCRAFT IN COMMISSION AND ASSIGNED

| | MAR | APR | MAY | JUN | JUL |
|---|---|---|---|---|---|
| TOTAL HOURS FLOWN | 90:20 | 164:45 | 195:10 | 211:40 | 148:45 |
| AIRCRAFT ASSIGNED | 3 | 3 | 3 | 3 | 3 |
| HRS FLOWN PER A/C ASSIGNED | 30:06 | 54:45 | 65:03 | 70:33 | 49:35 |
| NO. A/C IN COMMISSION | 2.3 | 2.1 | 2.6 | 2.5 | 2.3 |
| HRS FLOWN PER A/C IN COMMISSION | 39:18 | 78:30 | 75:01 | 84:42 | 64:42 |

AFWL/HB

Unit, provided assistance in the inter-atoll airlift effort, but were used also for priority airlift to distant bases so scheduled as not to interfere with the documentary photography and communications relay missions. Moreover, the C-54's were utilized for re-supply flights to Tarawa after late March replacing SA-16 aircraft.

The third airlift mission was the re-supply of Weather and Project Islands located at remote locations in the Pacific. These islands included Kapingamarangi, Kusaie, Ujelang, Rongerik, Utirik, Wotho, and Ailinginae. Tarawa was supplied by SA-16's before the transfer of that duty to the C-54 aircraft in March. SA-16 aircraft, of the Test Services Unit's Search and Rescue Element, were especially suited for the re-supply mission because of their water landing capability which was required at some of the islands.

From 1 February through 22 July, C-47 aircraft flew some 1,376 hours, airlifting 9,478 passengers and 536.51 tons of cargo. Beginning 1 March and ending 22 July, C-54 aircraft transported 1,212 passengers and 115.03 tons of cargo, while flying some 811 hours. During the same period, SA-16 airlift aircraft flew 1,799 hours, moving 1,189 passengers and 72.33 tons of cargo.

## Aircraft Accidents

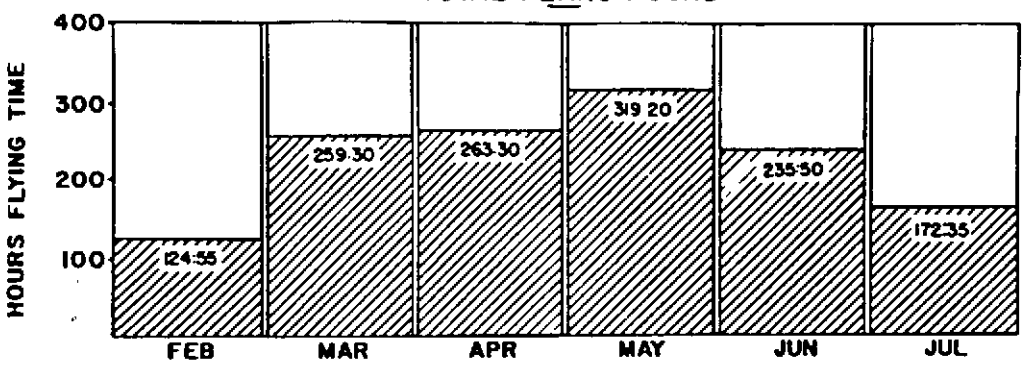
Aircraft of Task Group 7.4 during REDWING flew 15,019 hours, with three major accidents. The accident rate, therefore, to 22 July 1956 was 19.9 per hundred thousand flying hours. Two of these

[redacted] [redacted]

AFWL/HC

BEGIN 1 FEB 1956 **C-47** END 22 JULY 1956

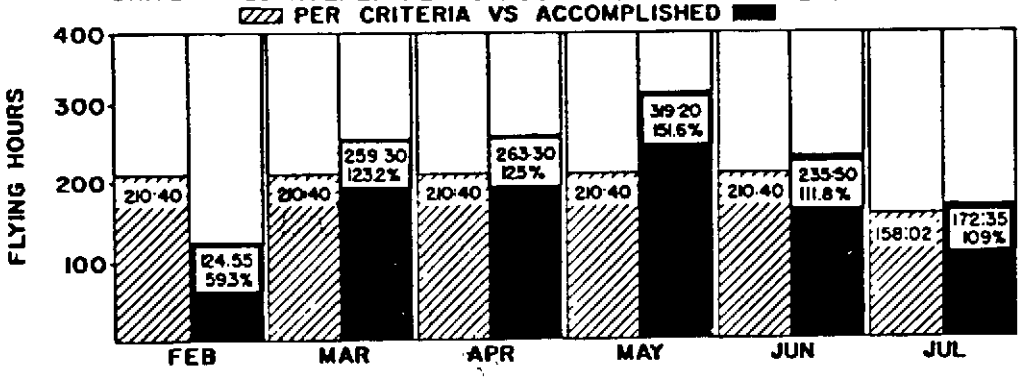
TOTAL FLYING HOURS



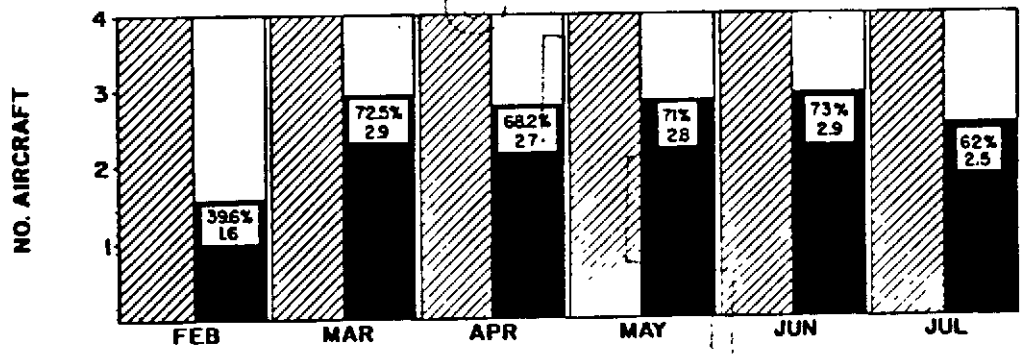

UTILIZATION

CRITERIA: QUARTERLY FLYING HOUR FACTOR 158 CODE CM

▨ PER CRITERIA VS ACCOMPLISHED ■




▨ ASSIGNED VS IN COMMISSION ■




HOURS FLOWN PER AIRCRAFT IN COMMISSION AND ASSIGNED

| | FEB | MAR | APR | MAY | JUN | JUL |
|---|---|---|---|---|---|---|
| TOTAL HOURS FLOWN | 124 55 | 259 30 | 263 30 | 319 20 | 235:50 | 172:35 |
| AIRCRAFT ASSIGNED | 4 | 4 | 4 | 4 | 4 | 4 |
| HRS FLOWN PER A/C ASSIGNED | 3113 | 64 52 | 6552 | 7905 | 5858 | 4309 |
| NO. A/C IN COMMISSION | 1.6 | 2.9 | 2 7 | 2.8 | 2.9 | 2.5 |
| HRS FLOWN PER A/C IN COMMISSION | 78:04 | 89:29 | 97:36 | 114:00 | 81:18 | 69:02 |

AFWL/HO

BEGIN 15 MAR 56

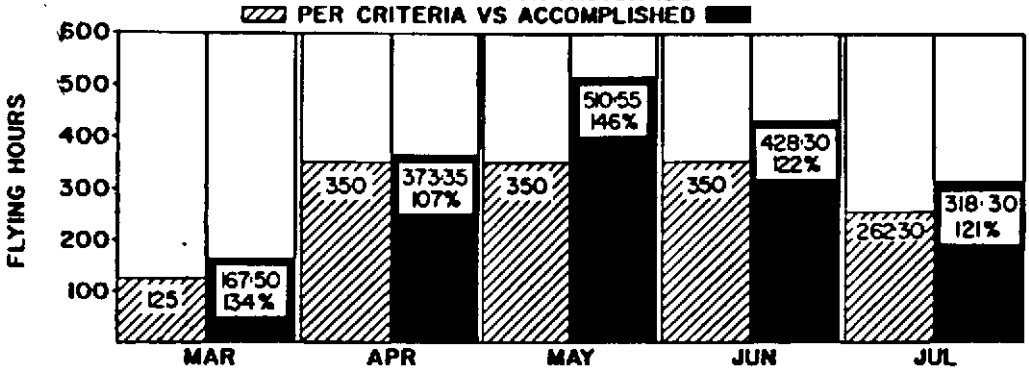
# SA-16

END 22 JULY 56

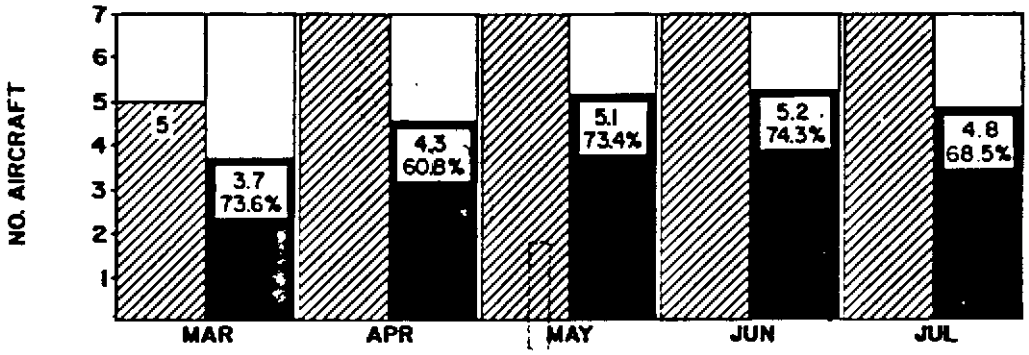
## UTILIZATION

CRITERIA: QUARTERLY FLYING HOUR FACTOR 150

▨ PER CRITERIA VS ACCOMPLISHED ■




▨ ASSIGNED VS IN COMMISSION ■




## HOURS FLOWN PER AIRCRAFT IN COMMISSION AND ASSIGNED

| | MAR | APR | MAY | JUN | JUL |
|---|---|---|---|---|---|
| TOTAL HOURS FLOWN | 167:50 | 373 35 | 510 55 | 428'30 | 318:30 |
| AIRCRAFT ASSIGNED | 5 | 7 | 7 | 7 | 7 |
| HRS FLOWN PER A/C ASSIGNED | 33 30 | 53 22 | 72 59 | 61:12 | 45:30 |
| NO A/C IN COMMISSION | 3.7 | 4.3 | 5.1 | 5.2 | 4.8 |
| HRS FLOWN PER A/C IN COMMISSION | 45.24 | 86 54 | 100 10 | 82.24 | 66:24 |

AFWL/HO

accidents involved B-57 aircraft, and the third involved an H-19B. In addition to these, A C-124 of the Military Air Transport Service crashed on the Eniwetok runway; however, this aircraft was not directly participating in REDWING activities and was not counted in the Task Group 7.4 accident rate.

On 29 March, B-57 Number 52-1501 settled to the Eniwetok runway with the landing gear retracted during an attempted take-off, skidding some 3,000 feet and receiving major fuselage damage. To remove the aircraft from the runway, it was de-fueled, placed on jacks for an extension of the landing gear, and towed away. Although not considered a direct cause of the accident, the fact was revealed in the subsequent investigation that correct take-off procedures were not being used by the pilot. Correct landing and take-off techniques, therefore, were stressed in all subsequent flight safety meetings and pre-shot briefings.

Warner-Robins Air Materiel Area personnel surveyed the damage, acquired the necessary materials, replaced the engines, and restored the aircraft to flying status by 22 May. Lack of the aircraft, a sampler of the Sample and Decontamination Element, did not materially affect the efficiency of the over-all sampling mission.

The second task group aircraft accident occurred on 10 May, when an H-19B was involved in a taxi mishap at Site GENE in the Eniwetok Atoll. The aircraft had landed to allow a radiological

[redacted]

safety moniter to check the radiation level on a vehicle, when all three main rotor blades struck a radio antenna pole. The aircraft was removed by surface vessel to Eniwetok, where repair was made. The aircraft was returned to in-commission status on 14 May.

The most serious accident during *REDWING* happened on 18 May, when B-57B Number 52-1531 of the Early Penetration Element was lost at sea while returning from a cancelled CHEROKEE mission. In climbing to 26,000 feet in an effort to get above rainy conditions, the pilot felt an explosion and was conscious of a blinding flash. The right fire warning light came on immediately, followed by the left one within a few seconds. The pilot elected to abandon the aircraft; the observer ejected, and the pilot followed. The pilot was sighted by an SA-16 aircraft within 20 minutes, but because of rough seas the SA-16 was forced to orbit until a surface rescue was possible. The pilot was taken aboard a destroyer some four hours later, but an extensive search failed to reveal any trace of the observer, Captain Paul M. Crumley.

On 16 June, a C-124 of the Military Air Transport Service, approaching Eniwetok, landed short of the runway, sheared off the landing gear, and came to rest 2,000 feet from the southeast end of the runway. Fire resulting from the crash was extinguished within three hours. There was no loss of life, and most of the

[redacted]

AFNWHO

cargo, although damaged by water and foam, was recovered. The runway was cleared of wreckage and was opened to normal traffic on 17 June. Salvage of certain undamaged aircraft components was accomplished by a team from Hickam Air Force Base.

## Radiological Safety Activities

In only two events was radioactive fallout appreciable during Operation REDWING. After the MOHAWK shot a small amount of fallout was measured at Eniwetok; however, this fallout added less than 50 milliroentgens to individual total accumulated personnel dosage.

In the other event, at 1530 hours on 21 July, following the TEWA shot, a radioactive fallout was detected at Headquarters, Task Group 7.4. Radiological Safety Officers of other agencies of the Joint Task Force confirmed that the fallout was general over the Eniwetok lagoon and atoll areas. A constant monitoring of Task Group 7.4 areas was performed during the night, by which the Radiological Safety Officer determined that the rate of exposure, resulting from the combination of radiation "shine" from the passing cloud and the fallout, reached a level of 80 milliroentgens per hour. At about 0330 hours on 22 July, a rain raised the combined level to 100-110 milliroentgens per hour; subsequent, non-radioactive rain, however, reduced the amount of remaining fallout to safer levels.

[redacted] [redacted]

It was the combined recommendation of Joint Task Force SEVEN and various task group radiological safety officers that no special clothing requirements or restrictions be made for personnel unless the level rose to one constantly over 100 milliroentgens per hour. Inasmuch as the high level occurred early in the morning hours and was reduced before duty hours, and since the peak exposure rate from fallout alone was determined to be approximately 80 milliroentgens per hour, no extra precautions were deemed necessary.

Nevertheless, on 22 July, upon notification of high intensity levels in the lagoon resulting from the TEWA fallout, the Task Group 7.4 Radiological Safety Officer recommended that the Eniwetok lagoon and swimming areas be placed off-limits until reduction of the level to acceptable tolerances. The task group Commander concurred in this recommendation and personnel were restricted from the cited areas.

No outstanding dosages were recorded at other island locations where personnel of Task Group 7.4 were operating. At Rongerik, where fallout was received in significant quantities during CASTLE, only light fallout subjected personnel to approximately two or three roentgens of accumulated dosage throughout REDWING.

[redacted]

[redacted]

NOTES

1. Amend. to Tab A, App. 8, Annex C; and Tab A, App. 13, Annex C. Ops. Order 1-56 TG 7.4, subj: CHEROKEE Positioning Conference, 5 May 56, in 4950th Test Gp. (N) hist. files.

2. Photo, Mission Execution Chart, CHEROKEE, 21 May 56, in 4950th Test Gp. (N) hist. files.

[redacted] [redacted]

AFWU/HO

## CHAPTER III

## ROLL-UP PHASE OF OPERATION REDWING

The operational phase of Operation REDWING was terminated on 22 July 1956, when the last shot, HURON, was detonated. Considerable roll-up activity, however, had been completed prior to the 22nd; in fact, some aircraft not required in the last events had already departed from the proving ground to meet other commitments or were already in the process of being seasoned. By 26 July, all short range aircraft had been prepared for surface transportation and had begun the return trip to the Zone of Interior or to their appropriate overseas stations by 27 July.

The Materiel Directorate had published Roll-up Plan 2-56 in May 1956 to outline the duties of the Units in establishing corrosion control and processing lines, and in disposing of vehicles, weather island materiel, and general supplies and equipment. Some of these processes were already underway by mid-July.

### Supply and Equipment

Materiel. Inasmuch as the Test Base Unit (except for the H-19 Lift Element) was a permanent organization at Eniwetok, known during interim periods as the 4930th Support Group (Test), the unit was charged with the difficult roll-up task of receiving from

[redacted]

[redacted]

AFWL/HO

the elements, processing, documenting, and arranging for transportation of, all surplus supplies and equipment.

The disposition of Task Group 7.4 materiel was discussed as early as February 1956, when the Director of Materiel and the Supply Staff Officer attended a conference at Headquarters, Air Materiel Command. Histories and reports of previous tests in the proving ground had disclosed that great loss of materiel during interim periods had resulted from the corrosive conditions of the proving ground, from the lack of proper storage facilities, and from the lack of facilities and manpower to process equipment and supplies. Therefore, at the February conference a disposition plan was formulated which would circumvent to a great extent the inherent problems of storage and disposition of supplies and equipment.

According to the plan, the 3103rd Logistics Control Group prepared a brown-line (machine) listing of all items shipped to the proving ground for use by Task Group 7.4. This listing was sent to the Commanders of Air Materiel Command, of all Air Materiel Areas, and of Far East Air Force. The Commanders of each Air Materiel Area and Far East Air Force were to screen the list, annotate those items required by their organizations, and forward the list to Task Group 7.4 for shipping action. Air Materiel Areas were to have priority over Far East Air Force in case of

[redacted] [redacted]

AFWL/HO

conflicting requirements. Common and low cost items peculiar to participating element aircraft, according to the plan, were to be sent to the Base Supply of respective elements.

By 31 July 1956, disposition instructions for some 60 per cent of supplies had been received from the Air Materiel Areas and Far East Air Force. Instructions for the remaining 40 per cent were received by mid-August.

In carrying out the roll-up plan, Headquarters, Task Group 7.4, the Test Aircraft Unit, and the Test Services Unit augmented the Test Base Unit with personnel. By 22 July, Category I, II, and III items were already being inventoried by the Test Base Unit, and the remainder of the roll-up process was expected to require approximately 60 days.

Augmentation did not proceed as rapidly as planned after 22 July because elements, needing their personnel for their own roll-up requirements, could not release immediately those persons who had been appointed for augmentation duties. By 31 July, approximately 25 airmen from other organizations had been given roll-up jobs in the Test Base Unit; however, by 8 August the number was increased to approximately 70, and the roll-up then advanced rapidly. Even with this delay in full augmentation, the roll-up was completed in all except isolated areas by 1 September, almost 20 days less than the forecast time.

[redacted]

A total of 15,783 line items were prepared during the roll-up period for shipment, and most of these items were actually shipped by 1 September, all shipping dates being met without difficulty. In all, approximately 1,276 tons of materiel were transported from the proving ground; more than 1,141 tons were shipped by surface means, and some 135 tons were shipped by air.

Two special aspects of the roll-up involved (a) the dismantling, packing, and return to the Zone of Interior of the seven borrowed Complete Assembly Shelters and (b) the recovery and disposition of runway arresting devices.

Complete Assembly Shelters. Early in July a request for disposition instructions for the complete assembly shelter buildings was sent to Air Materiel Command. The instructions were received late in August. The shelters were dismantled in July and August, and were returned to the Zone of Interior by water transportation to Shelby Air Force Depot, Ohio, for rehabilitation and distribution to Air Force agencies.

Runway Arresting Devices. The roll-up of runway arresting devices was begun immediately after the firing of the last shot. A work order was issued to Holmes and Narver for removal of MA-1 barrier hardware from NAN, PETER-OBOE and JANET for return to Eniwetok Island. Anchor chains at these sites were left in place.

[redacted]

Air Materiel Command advised Task Group 7.4 that one set, that is two complete barrier assemblies, was needed at Andersen Air Force Base, Guam. This set ultimately was sent to Guam. The remaining barrier sets were retained in the proving ground for future test use.

Air Force Special Weapons Center received authority for retention of the Navy net barricade in the proving ground. The hardware, therefore, was removed from the installation site on the Eniwetok runway, was treated for control of corrosion, and was stored for future use.

The cross-deck pendant, installed on the Eniwetok runway, according to instructions from the Navy Bureau of Aeronautics, was shipped in September to the Naval Air Station, Barbers Point, Hawaii. The Bureau of Aeronautics, however, granted permission to the task group to keep the anchor chains in the proving ground.

Short Range Aircraft. Early in July, three civilian specialists from Sacramento Air Materiel Area arrived at Eniwetok to direct, and assist in, the cocooning of short range aircraft in preparation for return of the aircraft to the Zone of Interior by surface carriers. The team began the cocooning operations on 2 July and, by 22 July, had prepared six H-19's, ten F-84G's, two F-84F's, two L-20's, one F-101, and one L-21 for shipment. The USS Curtiss sailed for San Diego, California, on 24 July with

[redacted]

the F-101 and the six H-19 aircraft aboard. The remaining cocooned aircraft, plus 259 measurement tons of Task Group 7.4 equipment, belonging to the Sampling and Decontamination Element, departed from Eniwetok for San Diego aboard the USS Badoeng Strait on 25 July.

Air Operations Center Equipment. After some four months of excellent performance, the Air Operations Center was closed on 22 July, subsequent to the HURON mission. Roll-up of the equipment was begun immediately. The equipment measuring approximately 15,000 pounds, was dismantled and packaged, and was shipped on 27 July to Kirtland Air Force Base by special airlift, arriving at Kirtland on 29 July.

The equipment was to be retained at Kirtland for future use at the Nevada Test Site and in the Pacific Proving Ground. Indication was given in late July that certain modifications would be performed on the equipment before the spring of 1957, possibly by Hazeltine Electronics Corporation or by Rome Air Force Depot.

## Movement of Personnel to the Zone of Interior

A conference was held on 9 July by Joint Task Force SEVEN to discuss passenger roll-up planning. Representatives of all the task groups and Joint Task Force SEVEN were present. The conferees determined that the Task Force had a requirement for Military Air

[redacted]

Transport Service airlift of approximately 1,920 passengers. Passenger space on aircraft was prorated so that Headquarters Joint Task Force SEVEN would receive 6 per cent, Task Group 7.1 would receive 45 per cent, Task Group 7.2 would receive 4 per cent, Task Group 7.3 2 per cent, Task Group 7.4 35 per cent, and Task Group 7.5 8 per cent. Prior to 22 July, 284 personnel of Task Group 7.4 departed from the proving ground, and the remaining 1,660 departed before 1 September.

## Costs of Task Group 7.4 Operations[1]

At the writing of this historical study, the Cost Analysis of Operation REDWING was subject to revision since, because of the great backlog of supplies in the proving ground, the supply documents had been only partially posted. The study thus covered REDWING operations only through 30 June 1956. However, an indication of the magnitude of REDWING may be gained from the analysis, published about 1 September 1956. This analysis showed the aggregate cost of Task Group 7.4 operations to be $13,291,740.45. Sources for these funds and the amount provided from each source were as follows: (a) Joint Task Force SEVEN, $664,097.83. (b) Armed Forces Special Weapons Project, $98,841.37. (c) Air Research and Development Command, $3,464,194.02. (d) Other Air Force agencies, $9,064,607.23.

[redacted]

The aggregate cost was composed of the costs in the following categories:

| Category | Total Cost |
|---|---|
| Labor (including pay, etc.) | $ 2,912,441.00 |
| Supplies | 407,100.78 |
| Contracts | 165,600.60 |
| Temporary Duty | 498,123.30 |
| Aircraft Modification | 28,249.42 |
| Subsistence | 178,070.21 |
| Other* | 9,102,155.14 |
| Aggregate | $13,291,740.45 |

Local purchase of supplies was an especially troublesome aspect of planning and operation. The problem was never completely resolved during the planning and build-up phase because of an original underestimation of the extent and cost of Local Purchase supplies. Several factors caused this underestimation: (a) Lack of historical data from Operation CASTLE. (b) A general rise in prices since Operation CASTLE. (c) A great number of items had been changed from "Centrally Procured" to "Local Purchase," to be funded and procured by requisitioning organizations. (d) Air Materiel Command had altered its logistics procedures since Operation CASTLE so that Centrally Procured items not in stock were no longer procured with Air Materiel Command funds by obligation authority.

---

* "Other" includes aircraft operation cost; petroleum, oil, and lubricants; certain transportation and communication costs; and costs in other miscellaneous categories.

[redacted]

Initially, Air Materiel Command agreed to fund for Local Purchase based on an estimate of $20,000. Air Materiel Command continued the funding until some $166,000 had been expended during the first few months of the planning and build-up phase, despite the original estimation error. The funding responsibility then was transferred to the Special Weapons Center, which provided approximately $189,000. Thus, a total of approximately $355,000 was spent for Local Purchase items throughout REDWING.

(Detailed information regarding categorical expenditure of funds may be found in Cost Analysis of Operation REDWING, a study by the Deputy Chief of Staff, Comptroller, Air Force Special Weapons Center, which study was susceptible to revision.)

Construction Requirements of Future Operations

In April 1954, Task Group 7.4 (for Operation CASTLE) submitted to Joint Task Force SEVEN a list of construction requirements to be completed in the proving ground prior to the beginning of Operation REDWING. This list contained also requirements for the period through Fiscal Year 1958.

Because no agency other than the 4930th Support Group (Test) had actively monitored the interim construction program to keep it current, the REDWING Task Group 7.4 found that many changes in the long range program were necessary. Significantly, too, the budget requests of the Atomic Energy Commission (which provides

[redacted]

AFWL/HW

funds for, and administers all, Pacific Proving Ground construction) for Fiscal Years 1957 and 1958 had been based upon the CASTLE Task Group 7.4 recommended construction program, which visualized few requirements for major construction during the period through Fiscal Year 1958. By the time the REDWING Task Group 7.4 had reviewed and re-oriented the programs for Fiscal Years 1957 and 1958, fixed dollar ceilings had already been established for Fiscal Year 1957 construction at Eniwetok and little provision had been made for Air Force requirements subsequent to Fiscal Year 1957.

Long range construction in the proving ground became a primary subject of Task Group 7.4 consideration in April and May 1956. Many of the fundamental issues of construction, however, had been discussed at great length on 12 March 1956, when the task group advance echelon had just arrived at Eniwetok. Colonel Paul R. Wignall, the Advance Echelon Commander, met with representatives of Atomic Energy Commission, Task Group 7.2, and other members of Task Group 7.4 to consider the general long range construction plans.

Then on 24 March, Colonel Samuel, in a letter[2] to the Joint Task Force SEVEN Commander, provided information regarding the construction program which he hoped might "be of some value in redirecting the program" to accommodate "a more comprehensive

[redacted]

view of Air Force requirements." He asserted that Task Group 7.4 had already undertaken the development of a realistic, forward-looking program, which he understood was to be considered, in conjunction with other Joint Task Force requirements, soon after arrival of Task Group 7.4 in the forward area, but "much to our surprise, before myself or my Director of Materiel (who were monitoring this program) arrived in the forward area, a meeting was called on about one hour's notice to consider this program." Although representatives of Task Group 7.4 had been present at the meeting on 12 March, "they were in no position to present a comprehensive, coordinated program" in the absence of Colonel Samuel. Nor were they able to present adequately his immediate and personal views.

Therefore, when Colonel Samuel arrived at Eniwetok in March, he immediately convened his Staff and Unit Commanders to examine the program and consolidate recommendations. A subsequent letter to Joint Task Force SEVEN listed the Task Group 7.4 construction items in four categories in priority order as follows: (a) Group I, those items considered to be absolutely essential. (b) Group II, those items considered extremely desirable because of their material contribution to safety of operations. (c) Group III, those requirements which, though not essential, would definitely improve the mission capability and dependability of Task Group

[redacted]

7.4. (The construction program seemed most susceptible to downward revision of priority in this area.) (d) Group IV, those items which were not an Air Force responsibility but were of interest to the Air Force.

The first construction conference after submission of the Task Group 7.4 proposals was called by Task Group 7.5 on 14 April to consider the Joint Fiscal Year 1957 program. In order to be within appropriated funds, the program came under an examination aimed at a downward revision from $916,000 to $850,000. Furthermore, a portion of the over-all appropriated funds were to be set aside for an operation fund for maintenance and minor new construction, thus reducing the amount available for major construction. In an effort to make some of these funds available for early initiation of the runway extension program (included in Group I as Item 1 in the March priority list), Colonel Samuel recommended that both its recommended warehouse and the re-skinning of the hangar be deleted from the construction program. Over Task Group 7.4 objections, the conference led to the development of a program which made no provision for immediate runway extension and substituted an igloo-type building for the warehouse.

The program was protested by Task Group 7.4 in a letter[3] to the Deputy for Air, Joint Task Force SEVEN, the strongest objection being directed to the failure to consider the runway

[redacted]

extension on which construction would have to be initiated as soon as possible to insure completion before the next nuclear test operation.

On 25 April, a conference was called by Joint Task Force SEVEN to discuss the long range program. The committee chairman proposed to consider requirements beyond Fiscal Year 1958, but since the letter of invitation to the conference had indicated specifically that only the Fiscal Year 1958 program would be examined, Task Group 7.4 representatives had concentrated on this program alone, deferring consideration of later programs. As the result of a Task Group 7.4 protest, supported by the representatives of Task Group 7.2 and 7.5 the considerations were limited to the Fiscal Year 1958 program. Finally a program was developed incorporating relative priorities among the several task groups. The conferees agreed that those items in the Fiscal Year 1958 program below priority 15, unless funded for in that program, would lose the priority shown therein and would be reconsidered in their proper perspective in the long range program, being assigned priorities accordingly.

On 23 May 1956, Task Group 7.4 forwarded to Joint Task Force SEVEN its long range program based on five general principles.[4] The first principle was the assumption that future test operations would be of a magnitude comparable to that of REDWING.

[redacted]

Secondly, the program was founded on a master plan concept with construction being phased over a period extending through Fiscal Year 1962. The third principle allowed for full utilization of Complete Assembly Shelters in Fiscal Year 1958, partial elimination of these buildings in Fiscal Year 1960, and complete elimination of them in Fiscal Year 1962. Delays in construction projects, however, could necessitate a lengthening of the requirement for the buildings. The fourth principle assumed that certain facilities, based on economical termination of useful life, would be eliminated gradually. Finally, the long range program would include those items below the priority 15 which were deleted from the Fiscal Year 1958 program.

No effort was made to divide the Task Group 7.4 long range construction program into individual yearly packages, because fund availability would ultimately dictate the size of these packages in any case. The program, however, was based on a general estimate of completion not earlier than Fiscal Year 1962. Colonel Samuel stressed the desirability of accomplishing Air Force construction during non-test periods.

A Joint Task Force SEVEN conference was convened on 23 May to consider the Task Group 7.4 program along with those of the other task groups. The principal item of interest to Task Group 7.4 was its proposal that no relative priorities in the several-

[redacted]

group program be established at that time. Although the Task Group 7.4 representatives understood this proposal to have been adopted and agreed upon, the conference report[5] did not make this agreement clear. Although the report made note of the recommendation, in another portion of the report a detailed priority listing was suggested, and this listing was shown in the inclosure.

The report contained other points that Task Group 7.4 personnel considered to be discrepancies. It did not reflect the Task Group 7.4 reappraisal of Air Force items of low priority in the Fiscal Year 1958 program which had been relegated to the longer range program. It also provided for no action to change priorities involving communications, fresh water, and electrical power facilities which had been listed in the Fiscal Year 1958 program as Air Force items. (These facilities, in fact, were items of common and general concern to all service organizations at Eniwetok and not to the Air Force alone.) The report further erroneously reflected the Task Group 7.4 position by compressing all Task Group 7.4 projects into a program terminating in Fiscal Year 1960, whereas Fiscal Year 1962 had been envisaged as the earliest date for completion of the construction.

Again, on 21 June, the entire future construction program for the Air Force was reviewed in a Task Group 7.4 conference. In particular, the Fiscal Year 1958 program as submitted to the

[redacted]

Joint Task Force was reviewed to ascertain more fully its sufficiency and adequacy. However, the program through Fiscal Year 1962 was also scrutinized, and only a few changes were made, none of which would significantly alter the over-all program as described to Joint Task Force SEVEN. Much attention was given to the development of stronger justification for the items in the program.

On 27 June, the detailed plan of the Joint Task Force SEVEN Construction Program was forwarded to the Atomic Energy Commission. Colonel Samuel still was concerned about several aspects of the program, especially about the general listing of priorities. However, the forwarding letter which accompanied the Joint Task Force program to the Commission did make a special mention of the impertance of early initiation of work on the runway extension project. The letter also stated, somewhat inconspicuously, that no relative priorities were established, but at the same time the long range program was outlined in a definite priority listing. All discrepancies of the program, pointed out by Colonel Samuel in May, were still evident. Colonel Samuel disagreed particularly with the lack of stress placed upon the importance of maximum, not just major, Air Force construction during interim periods.

On 18 July 1956, Colonel Samuel in a letter[6] to the Commander, Joint Task Force SEVEN, again called attention to the inadequacies

[redacted]

of the long range construction program, from the Air Force point of view. He asserted that the Joint Task Force SEVEN program submitted in June to the Atomic Energy Commission fulfilled the Task Group 7.4 request to stress the need for early beginning of the runway extension project. However, the program appeared to depart from, or fall short of, agreements reached during the two joint conferences in April and May. The letter summarized the inadequacies which had appeared throughout the developmental phase of the construction program: (a) The improper listing of common interest items as Air Force items. (b) The failure to reflect revised priorities for items below priority 15 in the Fiscal Year 1958 program. (c) The inconsistency between the statement that no Joint Task Force SEVEN priorities had been established and the actual indexing and listing of line items on a priority basis, in the long range program. (d) The fact that Air Force items had been compressed into a program ending with Fiscal Year 1960, when this construction was intended by Task Group 7.4 to terminate with Fiscal Year 1962. (e) The fact that interim construction of major Air Force items had been accentuated, whereas emphasis should have extended to provide for <u>all</u> predictable construction during interims so as to reduce costs and confusion prevelant during test periods.

[redacted]

Early in August 1956, the Task Group 7.4 construction program was reviewed for the third time since its submission on 23 May to Joint Task Force SEVEN. No outstanding changes were noted, and no evidence was available to indicate that either Joint Task Force SEVEN or Atomic Energy Commission had taken action to reorient the construction program, as suggested by Task Group 7.4.

[redacted]

[redacted]

NOTES

1. Study, Cost Analysis of Operation REDWING, DCS/Comp., AFSWC, no date (about 1 Sept. 56), in 4950th Test Gp. (N) hist. files.

2. Ltr., Comdr. Task Gp. 7.4 to Comdr. JTF-7, 24 Mar. 56, subj: FY 57-58 Construction Program, in 4950th Test Gp. (N) hist. files.

3. Memo, Comdr., Task Gp. 7.4 to Brig. Gen. Perry B. Griffith, 23 Apr. 56, no subj., in 4950th Test Gp. (N), Comdr. files.

4. Ltr., Comdr., Task Gp. 7.4 to Comdr., JTF-7, 23 May 56, subj: FY 59 through 62 Development Plan, in 4950th Test Gp. (N) hist. files.

5. Memo., AC of S, J4, JTF-7 to Comdr. JTF-7, 29 May 56 subj: Joint Construction Conference, in 4950th Test Gp. (N) hist. files.

6. Ltr., Comdr. Task Gp. 7.4 to Comdr. JTF-7, 18 Jul. 56, subj: Long Range Construction Program, in 4950th Test Gp. (N) hist. files.

[redacted]

[redacted]

# GLOSSARY OF ABBREVIATIONS

## -A-

| | |
|---|---|
| (A) | Atomic |
| A/C | Aircraft |
| AC of S | Assistant Chief of Staff |
| AEC | Atomic Energy Commission |
| AFB | Air Force Base |
| AFCRC | Air Force Cambridge Research Center |
| AFOAT | Office of the Assistant for Atomic Energy |
| AFSWC | Air Force Special Weapons Center |
| AFSWP | Armed Forces Special Weapons Project |
| Agt. | Agent |
| Amend. | Amendment |
| AP & CS | Air Pictorial and Charting Service |
| App. | Appendix |
| Apr. | April |
| ARDC | Air Research and Development Command |
| Ark. | Arkansas |
| Asgd. | Assigned |
| Aug. | August |
| Aux. | Auxiliary |

[redacted]

[redacted]

-B-

| | |
|---|---|
| Bik. | Bikini |
| Brig. | Brigadier |

-C-

| | |
|---|---|
| Calif. | California |
| CAS | Complete Assembly Shelter |
| Civ. | Civilian(s) |
| CJTF | Commander, Joint Task Force |
| Cmd. | Command |
| Cmdr. | Commander |
| CNO | Chief of Naval Operations |
| Col. | Colonel |

-D-

| | |
|---|---|
| D.C. | District of Columbia |
| DCS/Comp. | Deputy Chief of Staff, Comptroller |
| DCS/O | Deputy Chief of Staff, Operations |
| D/F | Disposition Form |
| Doc. | Documentary |
| Dr. | Doctor |

-E-

| | |
|---|---|
| Eni. | Eniwetok |
| Exec. | Executive |

-F-

| | |
|---|---|
| Feb. | February |

[redacted]

[redacted]

| | |
|---|---|
| Fla. | Florida |
| Fld. | Field |
| FY | Fiscal Year |

-G-

| | |
|---|---|
| Gen. | General |
| Gp. | Group |

-H-

| | |
|---|---|
| Hist. | History, Historical |
| Hq. | Headquarters |
| Hrs. | Hours |

-I-

| | |
|---|---|
| IA | Inter-atoll |
| IBDA | Indirect Bomb Damage Assessment |
| IFF | Identification Friend or Foe |

-J-

| | |
|---|---|
| JCS | Joint Chiefs of Staff |
| JTF-7 | Joint Task Force SEVEN |
| Jul. | July |
| Jun. | June |

-L-

| | |
|---|---|
| La. | Louisiana |
| Lt. | Lieutenant |
| Ltr. | Letter |

[redacted]

[redacted]

AFWL/HO

-M-

| | |
|---|---|
| Maint. | Maintenance |
| Maj. | Major |
| Mar. | March |
| Mass. | Massachusetts |
| MATS | Military Air Transport Service |
| Md. | Maryland |
| Meme. | Memorandum |
| M.I. | Marshall Islands |
| Mich. | Michigan |
| Mil. | Military |
| Misc. | Miscellaneous |
| MT | Megaton |

-N-

| | |
|---|---|
| (N) | (Nuclear) |
| NASWF | Naval Air Special Weapons Facility |
| N. C. | North Carolina |
| N. Mex. | New Mexico |
| No. | Number |
| Nr. | Number |

-O-

| | |
|---|---|
| Okla. | Oklahoma |
| Ops. | Operations |

[redacted]

[redacted]

-P-

| | |
|---|---|
| Photo. | Photography |
| Pp. | Pages |
| Px. | Passengers |

-R-

| | |
|---|---|
| Recon. | Reconnaissance |

-S-

| | |
|---|---|
| Sep. | September |
| Subj. | Subject |
| SWF | Special Weapons Facility |

-T-

| | |
|---|---|
| TAC | Tactical Air Command |
| TAU | Test Aircraft Unit |
| TBU | Test Base Unit |
| Tech. Photo. | Technical Photography |
| T.G. | Task Group |
| T.H. | Territory of Hawaii |
| TSU | Test Services Unit |
| TWX | Teletypewriter Exchange |

-U-

| | |
|---|---|
| US | United States |
| USAF | United States Air Force |
| USS | United States Ship |

[redacted]

[redacted]

AFWL/HO

[redacted]

-V-

| | |
|---|---|
| Va. | Virginia |
| Vs. | Versus |

-W-

| | |
|---|---|
| WADC | Wright Air Development Center |
| Wea. | Weather |
| Wg. | Wing |

[redacted]

[redacted]

[redacted]

# INDEX

## -A-

A3D Aircraft, 21,55,56,67,89,114.
AFOAT-1 Element, 90.
Ailinginae, 100,106.
Air Defense Command, 47.
Air Drops of Weapons, 4-5,20,27,48-51,105-106.
Air Force Special Weapons Center, 2,3,4,6,7,8,9,10,11,13,21,25, 27,28,30,31,33,34,39,42,48,49,50,79,81,86,91,92,101,136, 140.
Airlift, Inter-Atoll, 31-32,33,34,35,91,92,95,124-126.
Airlift, Inter-Island, 33,34,91,92,124-126.
Air Materiel Command, 72,81,133,135,136,139,140.
Air Operations Center, 7,39,40,41,43,46,47,52,53,55,65,85,104, 106-107,108,109,110,112,114,115,117,119-120,137.
Air Pictorial and Charting Service, 32-33.
Air Police, 78.
Air Rescue. See Search and Rescue Element.
Air Research and Development Command, 2,4,6,7,8,9,10,11,21,33, 34,42,43,48,49,79,81,138.
Air Traffic Control, 64,65,97.
Air Training Command, 16.
Airways and Air Communications Service, 18,97.
Air Weather Service, 30.
Andersen AFB, Guam, 136.
AN/UPA-35, 42,43.
AN/UPX-1, 41.
AN/UPX-4, 41.
AN/UPX-7, 41.
AN/USQ-12, 40,45,46.
APACHE, 116-117.
Armed Forces Special Weapons Project, 2,63,96,138.
Army, U.S., 93,97.
Atomic Energy Commission, 1,60,61,78,86,140,141,147,148,149.
Auxiliary Equipment Laboratory, Rome Air Force Depot, 42.

## -B-

B-29 Aircraft, 29.
B-36 Aircraft, 27,28,29,30,48-51,57,90,106,111.
B-47 Aircraft, 5,21,27,28,29,50-51,54,56,87,106,107,108,114,118, 119.

[redacted]

B-52 Aircraft, 5,21,28,29,50-51,55,57,87,90,104,105,106,107, 108,109,115,118,119,
B-57 Aircraft, 4,5,21,22,23,24,25,26,30,47,52,55,68,74,86,87, 88,100,103,104,105,106,108,112,113,114,115,118,119,127, 128.
B-66 Aircraft, 5,21,53,54,55,67,76,77,87,104,106,107,108,109, 113,114,117,118,119.
BACKDOOR Aircraft, 104.
Barbers Point Naval Air Station, Hawaii, 136.
Barksdale AFB, Louisiana, 87.
BARLEY Aircraft, 55,105,106,107,108,115,117,119.
Barney, Col. William S., 93.
Barricade, See Barriers, Runway.
Barriers, Runway, 65-68,85,135-136.
BARRYMORE. See Combat Information Center.
Base Operations, Eniwetok, 40.
Base Supply, Eniwetok, 42,134.
[redacted] See ZUNI.
[redacted] See TEWA.
Bikini Atoll, 4,7,14,18,19,27,33,36,38,40,41,48,56,67,106,117, 118,120,124,
Black, Maj. Harry D., 10.
BLACKFOOT, 108-109.
Bokonikaiaru Island, Ailinginae Atoll, 51.
Bomb and Canister Drop Element, 27.
Book Message, 5,15,84.
Bureau of Aeronautics, U.S. Navy, 136.

-C-

C-47 Aircraft, 32,33,34,35,92,125,126.
C-54 Aircraft, 18,31,32,34,35,54,93,95,96,107,119,125-126.
C-97 Aircraft, 26,27.
C-124 Aircraft, 124,127,128.
Cambridge Research Center, 5,26,27,45,89.
Canberra Radio Broadcasts, 94.
Canister Drop, 29-30.
Carlson, Lt. Col. Francis B., 10,66.
CARTER Aircraft, 53.
CASSIDY Aircraft, 104.
CASTLE, Operation, 1-2,4,7,8,9,12,34,39,41,59,62,63,79,84,86, 130,139,140,141.
CHARLIE Island, Bikini Atoll, 48,105.
CHEROKEE, 14,17,27,28,29,35,48-51,53,56-58,90,96,103,104,105-106,128.
Civil Aeronautics Authority, 98.

[redacted]

CLARK Aircraft, 53,54,55,104,106,107,108,109,113,114,117,118, 119.
CLEAN Device, 117.
Clothing Requirements, 9.
Combat Information Center, 7,39,40,41,46,47,52,53,55,56,57,106, 109,113,114,117,118,120-122.
Communications Element, 97,98.
Complete Assembly Shelters, 63,135,145.
Concept of Operations for REDWING, 14,27,31,58.
Conference, Operational Planning, 16-22,26,30,31.
Control Tower, Bikini, 98.
Control Tower, Eniwetok, 40,41,64,65.
Crumley, Capt. Paul A., 128.

-D-

DAKOTA, 112,114-115,118,119.
Decontamination and Sampling Element. See Sampling and Decontamination Element.
deVries, Maj. John A., 6,39.
Division, 27th Air, 47.
Direction Finder Equipment, 40.
DIXIE, Operation, 1.
Documentary Photography. See Photography, Documentary.
Documentary Photography Element, 31,95-96,125.
DOG Island, Bikini Atoll, 109,114,117,118.
Drop and Canister, 51,90.

-E-

Early Cloud Penetration Project. See Project 2.66.
Early Penetration Element, 88-89,128.
Edwards AFB, California, 49.
Effects Element, WADC, 54,87.
[redacted]118.
Ehmendorf, Maj. Harry H., 3,19,20.
Eniwetok Atoll, 4,8,17,18,19,27,33,36,38,40,41,50,53,55,56, 68,90,98,106,108,111,115,116,117,118,120,124,127,129.
Enyu Island, Eniwetok Atoll. See NAN.
ERIE, 107-108.

-F-

F-6 Refueling Units, 37.
F-84 Aircraft, 4,5,21,22,25,30,47,53,55,56,67,75,76,86,87,105, 106,107,108,114,115,116,117,118,119,136.

[redacted]

[redacted]

F-89 Aircraft, 21.
F-101 Aircraft, 5,21,67,76,77,87,105,106,108,110,113,115,116, 117,118,136,137.
Far East Air Force, 93,96,133,134.
FB-36 Aircraft, 22.
Field Maintenance, 18.
Field Test Office, 4925th Test Group (Atomic), 2,3,6,39.
Fiji Radio Broadcasts, 94.
FLATHEAD, 54-55,108-109.
FLORA Island, Eniwetok Atoll, 116,118.
DELE [redacted] See MOHAWK.
Forrest, Lt. Col. B. E., 10.

-G-

Gassman, Dr. George J., 89.
GENE Island, Eniwetok Atoll, 127.
DEL [redacted] 109. See also KICKAPOO.
Global Communications System, 97.
DEL [redacted] 109. See Also BLACKFOOT.
Graves, Dr. Alvin C., 1,48.
Griffith, Brig. Gen. Perry B., 26.
Ground Control Approach, 40,64,98.
Group, 345th Bombardment, 88.
Group, 405th Bombardment, 88.
Group, 461st Bombardment, 88.
Group, 581st Air Resupply, 99.
Group, 3103rd Logistics Control, 72,133.
Group, 4925th Test (Atomic), 13,22,29,41,47,50,90.
Group, 4930th Support (Test), 8,16,18,33,34,58,59,60,74,91,132, 140.
Group, 6007th Reconnaissance, 31.
Guam, 95.

-H-

H-19 Aircraft, 33,34,40,65,69,92,124-125,127,136,137.
H-19 Lift Element, 91,92,132.
HARDTIME Aircraft, 56.
Harmon, Maj. William E., 66.
Hazeltine Electronics Corporation, 42-46,137.
Hickam AFB, Hawaii, 78,95,98,99,115,129.
Holmes and Narver, 46,60,61,68,135.
HOTSHOT Aircraft, 104,118.
Hunter, Lt. Col. (Col.) William A., 91.
HURON, 118-119,132,137.

[redacted]

Huston, Lt. Col. Laverne F., 91.

-I-

IFF, 40,41,44,47,52,56,114,118,119,121,122.
INCA, 56,112-114.
Indirect Bomb Damage Assessment Element, 21,56,87,95.
Ionospheric Element, 89-90.
Ionospheric Recorder, 89.
Ionospheric Study. See Program 6.3.
IRENE Island, Eniwetok Atoll, 108.

-J-

JC-97 Aircraft, 89.
James, Lt. Col. Jack, 30.
JANET Island, Eniwetok Atoll, 68,85,135.
JAYBIRD Aircraft, 55,104,106,107,108,109,115,118,119.
Joint Chiefs of Staff, 6.
Joint Field Test Operations Branch, AFSWC, 3,6.
Joint High Frequency Receiver Site, 97.
Joint High Frequency Transmitter Site, 97.
Joint Tape Relay Center, 97.
Joint Task Force SEVEN, 5,7,8,9,13,15,17,42,43,45,47,58,59,60, 67,76,78,79,81,94,95-96,99,102,130,137,138,141,142,143, 144,145,147,148,149.

-K-

Kadena AFB, Okinawa, 99.
Kapingamarangi, 74,94,98,100,126.
KICKAPOO, 109-111.
KIMONO Aircraft, 55,105,106,107,108,112,114,115-116,119.
Kusaie, 94,98,100,126.
Kwajalein Air Route Traffic Control, 98.
Kwajalein Major Relay Center, 97.
Kwajalein Naval Air Station, 51,100,107.

-L-

L-20 Aircraft, 33,34,40,76,92,125,136.
L-21 Aircraft, 76,92,136.
LACROSSE, 35,53,104-105.
Laine, Maj. Connie J., 102.
Langley AFB, Virginia, 88.
LENA Aircraft, 55,56,114.

[redacted]

[redacted] See YUMA and KICKAPOO.
Logistics Liaison Office, 72,123.
Lookout Mountain Laboratory, 31,32.
Los Alamos Scientific Laboratory, 1,14,36,48,86.

-M-

M-246 Aircraft Wrecker, 74.
McClellan AFB, California, 30.
McNeil Letter, 79.
McNeil, Mr. W. J., 79.
Maintenance Control Unit, 18,38,73,74,76,122-124.
Majure, 95.
MALONE Aircraft, 106.
MANHUNT. See Air Operations Center.
Marine Helicopter Squadron, 17,33,92,124-125.
Mark III IFF, 40.
Mark V IFF, 40.
Mark IX IFF, 40,44.
Marshall Islands, 69.
MEREDITH Aircraft, 105,106,108,110,113,115,116,117.
Military Air Transport Service, 15,17,18,20,32,88,93,98,99,
124,127,128,137-138.
Millcraft Corporation, 43.
Miramar Naval Air Station, California, 47.
DELET[redacted] Configuration, 111.
MOHAWK, 55,115-116,129.
MSQ-1A, 40,53,103,105,108,111,113,115,117,119,120.

-N-

Namu Island. See CHARLIE Island.
NAN Island, Eniwetok Atoll, 67,68,85,135.
NAVAJO, 117-118.
Naval Air Special Weapons Facility, 21,89.
Navy Effects Element, 54,89.
Navy, U.S., 6,47,52,61,67,93,94,120,136.
Nevada Test Site, 1,137.

-O-

Oakland Army Base, California, 72.
Office of Special Investigation, 78.
Office of the Assistant for Atomic Energy, 90.
Ogle, Dr. William E., 36.
Omohundro, Col. Thomas T., 3.

[redacted]

Operations. See individual operation by name.
Operations Plan 1-56, 38,39.
OSAGE, 17,30,50,90,110,111-112.
Ousley, Col. Carl A., 22,86.

-P-

P2V Aircraft, 21,89,104,107,108.
Parry Island, Eniwetok Atoll, 94,117.
PEARL Island, Eniwetok Atoll, 112.
Pendant, Cross-Deck. See Barriers, Runway.
PEWTER Aircraft, 54,107,119.
PETER-OBOE Island, Bikini Atoll, 68,85,135.
Photography, Documentary, 18,31-33,34,95,-96,119,126.
Photography, Technical, 30-31,96.
Ponape, 74,100.
Pope AFB, North Carolina, 92.
Program 2.66, 23,24-26,37,88.
Program 5, 20.
Program 6.33, 26-27.
Program 40, 21.
Programming Plan [redacted] 48.

-R-

Raydist, 41,53,55,56,103,106,107,109,120-122.
RB-36 Aircraft, 30.
RB-50 Aircraft, 30,31,53,93,96.
Relay, Airborne Communications, 31,32,34,95,126.
Robbins, Lt. Col. Carl W. Jr., 10.
Roscaforte, Capt. Philip A., 12,13.
Roll-up Plan 2-56, 132.
Rome Air Development Center, 43,44,45.
Rome Air Force Depot, 7,42,43,137.
Rongerik, 94,98,100,126,130.
RUBY Island, Eniwetok Atoll, 115.
Runit Island, See YVONNE Island.

-S-

SA-16 Aircraft, 33,35,53,55,56,65,68,69,92,93,99-100,126,128.
Sacramento Air Materiel Area, 76,123,136.
SALLY Island, Eniwetok Atoll, 106,109.
Sample Return, 20,78,86,98,99.
Sampling and Decontamination Element, 70,86,90,127,137.

[redacted]

Sampling Operations, 21,22,37,86,93,119,120.
Samuel, Col. John S., 10,11,12,14,19,23,24,26,28,32,36,50,57,61, 64,102,141,142,143,145,147.
San Clemente Island, 47.
Sandia Base, 69.
Santa Fe Operations Office, 61.
Sartain, Lt. Col. Clarence M., 9,81,85.
Schedule of Events, Operation REDWING, 4,5,13,14.
Scientific Task Group. See Task Group 7.1.
Search and Rescue Element, 18,33,35,40,68,69,93,99-100,126.
Selfridge AFB, Michigan, 35,68,99.
SEMINOLE, 108.
Service Force, U.S. Pacific Fleet, 8,61.
Shelby Air Force Depot, Ohio, 135.
SHELDON Aircraft, 54,106,107,108,114,118,119.
Sifo Island, Ailinginae Atoll, 51.
Signal Corps, U.S. Army, 97.
Spain, Mr. Paul, 61.
Squadron, 49th Air Rescue, 35,68,99.
Squadron, 55th Weather Reconnaissance, 30.
Squadron, 76th Air Rescue, 99.
Squadron, 310th Troop Carrier, 92.
Squadron, 1253rd Airways and Air Communications Service, 97.
Squadron, 1502nd Air Terminal, 98.
Squadron (Sampling), 4926th Test, 21,22,86.
Squadron, 4928th Test, 12,90.
Squadron, 4931st Operations, 91,92.
Squadron, 4932nd Materiel, 91,92.
STABLE Aircraft, 53,55,56.
Station 70 (Firing Bunker), 57,117.
Strategic Air Command, 21,24,26,87.
STUDENT Aircraft, 108.
[redacted] See INCA.

-T-

T-62 Shape, 111.
Tactical Air Command, 24-26,34,88,125.
Taongi Atoll, 90.
Tarawa, 90,94,95,98,126.
TARE Island, Bikini Atoll. 106.
Task Group 7.1, 14,35,36,88,124-125,138.
Task Group 7.2, 60,102,103,138,141,144.
Task Group 7.3, 138.
Task Group 7.5, 97,138,143,144.
TEAPOT, Operation, 1,3,41.

[redacted]

Technical Photography. See Photography, Technical.
Technical Photography Element, 92,93,96.
Terminal Element, MATS, 18,20,98.
Test Aircraft Unit, 16,18,65,71,85-90,101,134.
Test Base Unit, 16,18,78,91-92,101,125,132,134.
Test Services Unit, 15,17,18,92-100,125,126,134.
TEWA, 118,129-130.
Trimble, Maj. George L., 57.
Truk, 95.
Two-Shot Concept, 19,35-39.
[redacted] 27,48-51,105. See also CHEROKEE.
[redacted] 117. See Also NAVAJO.
[redacted] 107,108,114. See also ERIE, SEMINOLE, FLATHEAD, and DAKOTA.

-U-

Ujelang, 100,126.
Ultrasonics Corporation, 43.
"Ultrasonics" Project, 27,90.
University of California Research Laboratory, 86.
UPX-1. See AN/UPX-1.
UPX-4. See AN/UPX-4.
UPX-7. See AN/UPX-7.
USAF, Hq., 6,15,16,24-26,27,32,43,63,79.
U.S. Trust Territories Commissioner, 51.
USQ-12. See AN/USQ-12.
USS Badoeng Strait, 76,137.
USS Curtiss, 77,136.
USS Estes, 7,17,40,41,46,47,52,97,113,114,120,122.
USS Mount McKinley, 96.
Utirik, 100,126.

-V-

Vehicles, General Purpose, 8,9,75-76.
[redacted] See LACROSSE.

-W-

WAITER Aircraft, 53,55,56,105,106,108,114,116.
Wake Island, 90,95,98.
Warner-Robins Air Materiel Area, 22,23,127.
WB-50 Aircraft, 30,69,75,93.
Weapons Effects Test Division, 30.
Weather Central Element, 94,97.

[redacted]